TELEPHONE ENGINEER

VOLUME XXV OCTOBER, 1921 Number 4

ENGINEERING LIBRARY
DEPARTMENT OF
DEVELOPMENT AND RESEARCH
AMERICAN TEL. AND TEL. CO.

A Simple Automatic Switchboard For The Small Exchange

The makers of Strowger Automatic Equipment have never aimed to develop a particular kind of apparatus that would be equally satisfactory under all conditions and for all types of service.

Just as the service requirements of small towns and farm districts are simpler than those of the large city, so, too, are Strowger switchboards for small exchanges simpler than those for multi-office networks.

In the development of Strowger equipment for small exchanges, every possible element of complexity has been omitted; every essential of satisfactory service has been retained.

Automatic Electric Company now offers a "simplified" Automatic Telephone exchange system for the small town—a system free of all apparatus not necessary for the traffic needs of the smaller community. This naturally results in a lower cost and places this equipment within the financial reach of every small company—enabling that company profitably to place at the service of its subscribers the best telephone facilities money can buy.

Our increased manufacturing facilities permit early deliveries of this equipment. The Sales Department invites your inquiry. Complete information and estimates of cost will be promptly supplied.

AUTOMATIC ELECTRIC COMPANY

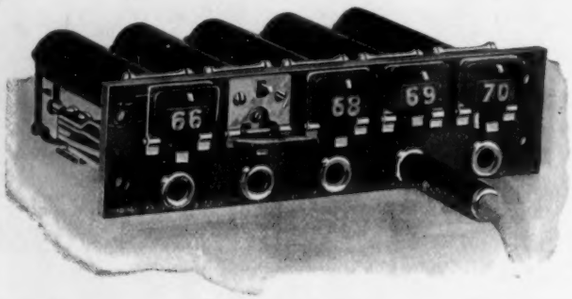
FACTORY AND GENERAL OFFICES, CHICAGO, ILL.

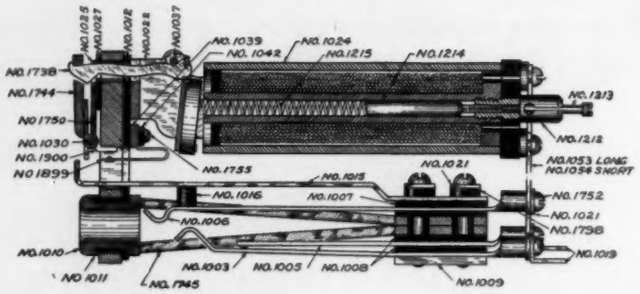
BRANCH OFFICES:

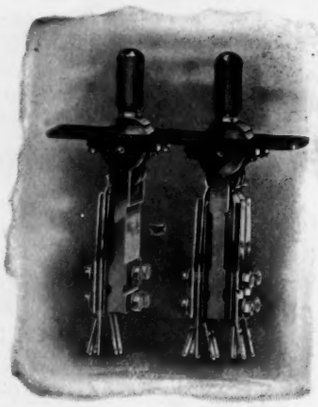
Kansas City, 1001 New York Life Bldg. | Philadelphia, The Bourse Bldg. | New York City, 21 East 40th St. | Boston, 445 Tremont Bldg. | Detroit, 525 Ford Bldg.
Cleveland, 415 Cuynhoga Bldg. | Columbus, 516 Ferris Bldg. | Rochester, 612 Mercantile Bldg. | Pittsburgh, 608 Fulton Bldg. | Washington, 403 Munsey Bldg.

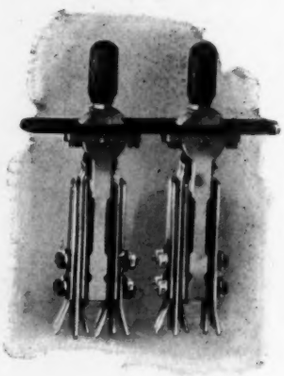
ASSOCIATED COMPANIES:

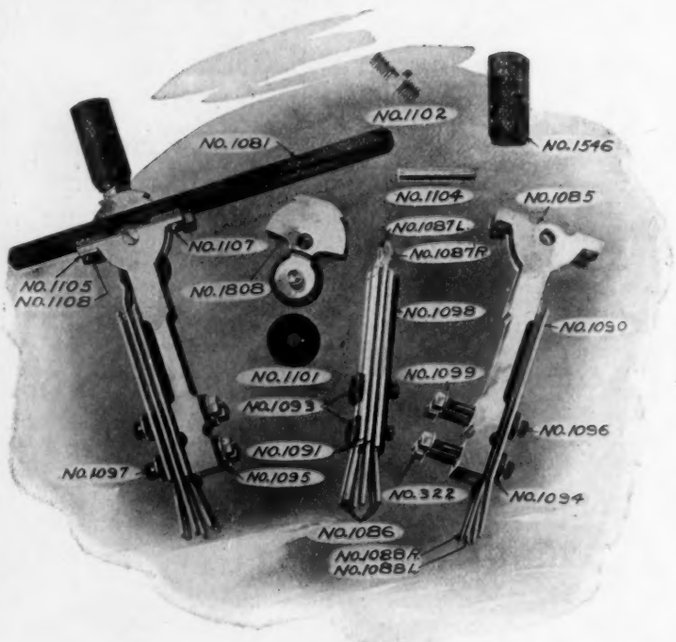
INTERNATIONAL TELEPHONE SALES AND ENGINEERING CORPORATION, New York
International Automatic Telephone Company, Ltd., London
Compagnie Francaise pour l'Exploitation des Procedes Thomson-Houston, Paris
Automatic Telephone Mfg. Co., Ltd., Liverpool
Automatic Telephones, Australasia, Ltd., Sydney











The Vital Parts of a Switchboard Demand Your Consideration

MONARCH Drops and Jacks and Keys have been proven by years of service to be the most durable, accessible and of most serviceable design.

The individual piece parts of all Monarch equipment made today will interchange, fit and work perfectly in all MONARCH equipment ever built.

The STANDARDIZATION of parts means low maintenance costs.

"Monarch for Service"

Monarch Telephone Mfg. Company

Factory and General Offices:

FORT DODGE, IOWA

DISTRIBUTORS:

Tel-Electric Co., Houston, Texas
Electric Supply Co., New Orleans, La.
Coker Electric Supply Co., Los Angeles, Cal.
Hendrie & Bolthoff Mfg. Supply Co. Denver, Colo.

TELEPHONE ENGINEER, October, 1921. Volume 25, No. 4. Published monthly by TELEPHONE ENGINEER. Publication office, 114 South Carroll street, Madison, Wis. Business and Editorial offices, 28 E. Jackson Blvd., Chicago, Ill. Subscription price $2 a year in the U. S. Entered as second class matter, September 1, 1921, at the post office at Madison, Wis., under act of March 3, 1879.

TABLE OF CONTENTS

On Inductive Interference 11–13
C. A. WRIGHT, OHIO UNIVERSITY'S telephone expert summarizes legal and technical phases of problem that is in the spotlight of the industry's attention.

Independent Convention Near 14
BIG MEETING OF INDEPENDENTS to be staged in Chicago in November at Hotel Sherman — Manufacturers to make first showing of much new equipment.

A Conquest of No Man's Land 15–18
E. A. J. SEDDON WRITES TALE of stringing wires across wilderness and of ceaseless vigils that keep cross-continent lines in good order despite "hell and high water".

Opinion and Comment 19
HIGH SPOTS OF MONTH'S activities touched at random. The Musketeers—Hope for the little 'uns—Tagging Them—Hold Fast; all chats on current developments.

Questions and Answers 20–22
A NEW DEPARTMENT conducted by W. N. Furthman. Here the puzzles that are wrinkling the brows of telephone men are solved from the experience of practical work.

Hoosiers Hold Big Meeting 23–24
INDIANA CONVENTION SUCCESSFUL in attendance and in spirit and results of sessions—The Hoosiers make many suggestions for more profitable telephone business.

Engineering of Buildings 25–26
THOS. B. LAMBERT TELLS ENGINEERING society of the important problems that confront the telephone man when he has to make a regular city layout under one roof.

"Vest-Pocket" Repeater Circuit 27
NEW YORK TEACHES SIMPLY all the fancy details of repeater circuits by miniature operating circuit laid out on a schoolroom wall.

Government's Telephone Book 28–29
BUREAU OF STANDARD ISSUES Circular 112 which is a condensed and authoritative text book bringing telephone knowledge of experts to all at low cost.

"Safety First" At Last 32–35
F. M. DOWNEY TELLS THAT safety first campaign of N. Y. Bell was a hard won campaign but it was worth the heart aches and head aches to cut down the accidents.

Connection Fee Just 36
W. S. VIVIAN, TELEPHONE AUTHORITY, shows how the thoughtless and unscrupulous subscriber has a check-rein in the service connection charge—An improvement is made.

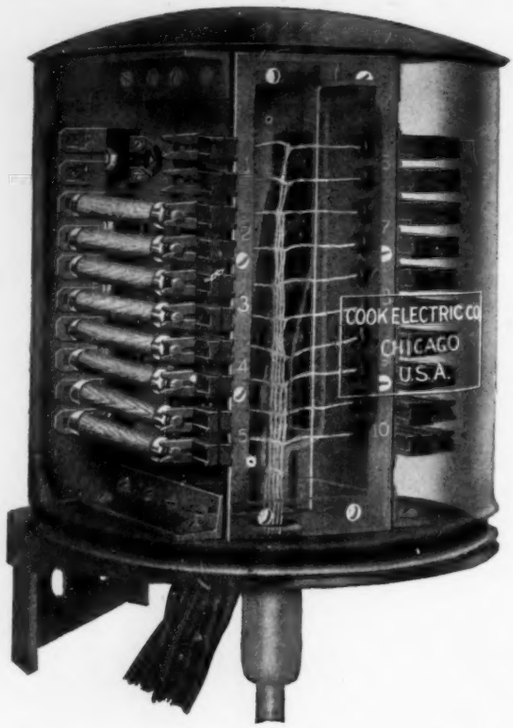
Selling a Toll Campaign 37–38
"EVERLASTING TEAM WORK of every blooming soul" is the keynote of the Southern Bell's plan for getting all the money coming to it from more toll business.

British Automatic Thriving 39–40
H. E. CLAPHAM'S STORY ABOUT big factory Automatic has built in Liverpool, England, shows that telephone business all over the world is booming in great shape.

An All Canadian Line 44
AT CANADIAN CONVENTION there is a strong sentiment in favor of a transcontinental line that will not leave the boundaries of the Maple Leaf empire—Live Session.

Index to Advertisers

American Electric Co. 8
American Steel & Wire Co. 45
American Telephone & Telegraph Co..... 48
Automatic Electric Co. 1
Baker & Co. 3
Benson & Co., Inc., Alex R..... 45
Blake Signal & Mfg. Co..... 45
Coffey System 45
Cook Electric Co. 10
Electrose Mfg. Co. 46
Federal Telephone & Telegraph Co.....10
Holtzer-Cabot Electric Co. 46
Indiana Rubber & Ins. Wire..... 45
Indiana Steel & Wire Co..... 46
Johns-Manville, Inc. 45
Kellogg Switchboard & Supply Co.....4 and 5
Monarch Telephone Mfg. Co. 2
National Carbon Co. 47
National Fireproofing Co. 46
National Pole Co. 45
New York Insulated Wire Co..... 45
North Electric Mfg. Co. 43
Premier Electric Co. 45
Reliable Electric Co. 3
Runzel-Lenz Electric Mfg. Co..... 8
Simplex Wire & Cable Co. 8
Standard Underground Cable Co. 45
Stromberg-Carlson Tel. Mfg. Co.....6 and 7
Warner Electric Co. 3
Western Electric Co. 47



COOK S-6

A perfect method of cable termination, a flexible means of distribution, combined with complete protection, is found in this all steel constructed pole cable terminal.

It is of the highest quality of material and workmanship. Decidedly superior to wooden terminals,—costs no more—but lasts years longer.

You can make no mistake, to standardize on this type, thousands of others have done so.

May we tell you more about it?

COOK ELECTRIC CO.

900-910 W. Van Buren St. Chicago

This unique instrument is not for sale in the United States or Canada—this advertisement is for interesting information only.

IN Holland the desk set is a complete unit. Portable bells mounted inside of cabinet--equipped with handle for carrying and is regularly furnished with the popular **Federal** Micro-telephone.

The Federal Company has a complete line of American Styles of telephones and switchboards which it offers to the American trade, built with the same exactness in material and workmanship as employed in our foreign apparatus.

Our engineering Department is ever at your service to help you with your operating problems.

Federal Telephone & Telegraph Co.
Buffalo, N. Y.

Federal

GENERAL OFFICES:
28 E. JACKSON BLVD.
CHICAGO, ILL.
TEL. HARRISON 4000

TELEPHONE ENGINEER

EASTERN OFFICE:
56 W. 45TH ST.
NEW YORK
TEL. VANDERBILT 3605

VOL. XXV MADISON, WIS.—OCTOBER, 1921—CHICAGO, ILL. NUMBER 4

Inductive Interference

Authority Considers Cause, Effect, and Treatment of Grief Power and Light Lines Have Brought to Telephone Companies---Technical and Legal Aspect

By C. A. Wright

The inductive interference problem is of the greatest interest to the telephone and telegraph, the electric power and light, and the electric railway companies. It is not of as great immediate interest to the public, but it is probably of greater interest ultimately, because of the deterioration of the various kinds of public utility service, and the increase in the cost of the service, resulting from attempts to mitigate the inductive interference.

The long distance circuits of the larger telephone companies are seriously affected by the interference. The service of a subscriber in a community where a high grade of telephone service is maintained may be poor when he converses over a long distance circuit, because of inductive interference hundreds of miles away. Although the local circuits of the larger telephone companies are generally underground or otherwise protected from inductive interference, their subscribers blame them for poor service, when they talk over long distance circuits to subscribers in smaller communities where the conditions with respect to inductive interference may not be good.

Smaller telephone companies can not as easily protect their circuits from the effects of inductive interference. Their length of circuit and pole line per subscriber is greater and their rates for service are lower because their subscribers have not been educated to as high a grade of service as those of the larger companies. It is not economically possible for them to maintain circuits which are not subject to inductive interference and in a great many cases their service is given over grounded lines, which are particularly difficult to protect.

The Bell telephone companies maintain an organization which solves for them such engineering and legal problems as this one, while the national and state independent telephone associations care for the interests of the larger independent telephone companies. The managers of the smallest telephone companies however, are frequently men who do not belong to the telephone associations and are not able to deal effectively with the electric power and light and railway companies, and their revenues do not permit the legal enforcement of their rights. Unless they are protected by the farmers' organizations the value of the service given many rural subscribers throughout the country and particularly in the Middle West is greatly decreased.

None Immune to Interference.

The lines of telegraph companies are generally not affected by inductive interference from power transmission lines, because of the high voltages and currents and low frequencies used as compared with those used in telephone circuits. To some extent however even telegraph circuits and apparatus may be affected by inductive interference.

The lines of the larger electric light and power companies in cases where they traverse rural districts may seriously interfere with communication circuits because of the high voltages of distribution used. This tendency is partly counteracted by the good construction of the transmission lines. The managements of these companies are generally willing to cooperate with the telephone companies whose lines they parallel and deal fairly with them. The construction of the transmission lines of the smaller power and light companies however is frequently cheap and poor, and their managements have in many instances been indisposed to cooperate with other utilities. In many cases parallels have been made where their transmission lines might well have been built over other routes, because they have not realized the injury to telephone service, or the value of this service to the public. Some of the electric power and light associations employ engineering and legal help for the solution of those problems.

Electric railways which are operated from single phase circuits with ground return cause serious inductive interference, which must be corrected by special means.

The telephone and telegraph companies are affected by inductive interference by direct impairment of their service, while the power and light and electric railway companies are affected mainly by the legal proceedings which are the result of the injury or probable injury to the telephone service.

Speedy Growth Causes Jam.

The development of our wire telegraph system of communication preceded by many years that of the others of our public utilities. The invention of the telephone in 1876, the construction of the first successful incandescent lamp in 1879, the development of the first successful

electric generators and motors about 1880, and the construction and operation of the first central stations and electric railways shortly afterwards, marked the beginning of the development of our electrical public utilities. Their growth has been so rapid that there has not been sufficient time to eliminate conflicts of interest.

In those sections of the country which are most thickly settled or where operating costs have been low, the construction of the power and light, and telephone lines has been such that there is not serious interference between them. The power and light companies have made use of private rights-of-way and the construction of their lines has been good. The telephone companies have placed a large part of their lines underground and full metallic circuits are generally used. In other sections of the country, however, these means of preventing interference have not been possible. The distances are great, and the users of the service are generally unable or unwilling to pay high rates for the service. In the smallest communities both the power and light and the telephone lines are frequently of the type which are likely to result in interference in cases where they are built along the same highways. Ground return telephone circuits which are used in some localities by the smaller telephone companies, especially the cooperative or farmer's mutual telephone companies, are particularly subject to inductive interference. The lines of such small power and light and telephone companies frequently suffer from faults of construction which might be avoided, and which emphasize these conditions, and the cooperation between the companies which might alleviate much of the trouble, is often lacking.

There may be physical contact between power and light and telephone lines which may result in ruined telephone apparatus, cause noise in telephone sets, or result in injury to the telephone subscribers, or the operating and maintenance force. The methods of avoiding such trouble are generally apparent and easy of application and the necessary separation is not great, so that the avoidance of interference from physical contact has not generally caused serious engineering or legal difficulty.

The effects of inductive interference, however, are more difficult to avoid. They are frequently felt when the lines are separated from each other by a distance of sixty feet, or, if the voltage of the transmission line is 30,000, or more by a much greater distance.

Solutions Proposed.

By far the most effective means of preventing inductive interference is to build the power and telephone lines along different routes. Frequently this can be done if both the power and light and telephone companies are disposed to cooperate. However, both kinds of service are developing so fast that there are an increasingly greater number of cases where this is not possible. In such cases the following measures will eliminate or mitigate the interference:

1). Power transmission and telephone lines should be built as far apart as possible. Sometimes for reasons of economy, the utility companies resort to the joint use of poles. In such cases special precautions must be taken to prevent serious interference and danger to life.

2). The power transmission lines should be transposed throughout their length.

3). The telephone lines, if metallic circuits are used, should be transposed, and the telephone transpositions coordinated with the transpositions in the power transmission lines.

4). Single-phase taps from three-phase power transmission lines should be kept at a minimum. Where essential, they should be made through transformers.

5). The power transmission lines should be kept clear of "grounds." Grounds from contact with trees or for other reasons may increase the interference to such an extent that it is impossible to use telephone lines which are normally quiet.

6). Telephone lines should be kept clear of grounds. While a ground on a telephone line may under some conditions decrease the interference, it may incidentally make the transmission poorer, and under other conditions it may increase the interference. It is always best to keep the line clear of grounds, and depend upon other means than accidental grounds to decrease the interference.

7). The generators which supply the power transmission line should be so designed that they do not cause serious interference. Much attention is now being given to the design of such generators. Many of the generators which are used in small central stations to carry night loads or as reserve generators are poorly designed in this respect and are the source of much inductive interference. Induction motors or other apparatus connected to the transmission line may also contribute to inductive interference troubles.

Some or all of the above methods of preventing or mitigating interference may be applied. In some cases special remedies may also be necessary.

The Legal Aspect.

The legal rights of telephone, power and light, and electric railway companies have been argued in many lawsuits resulting from cases of inductive interference. The courts have generally held that prior occupancy of a street or highway does not give the prior occupant a right to monopolize the use of that street or highway, but that it does give the prior occupant the right to protection from unreasonable interference, unless (1) the later occupant has a superior right to the use of the street or highway, (2) public need demands the use of the street or highway by the later occupant even if this use results in injury to the prior occupant, or (3) the pole lines, circuits, or apparatus of the prior occupant are not in proper condition. Inductive interference as well as physical contact or too great proximity of lines has been held to be "interference." "Protection" has been afforded by refusal to permit the construction of the lines of the later occupant, or more generally, by requiring the later occupant to pay the cost of eliminating the interference or reducing it to degree which is not unreasonable.

A superior right to the use of highways has been conceded to electric railways over power and right, and telephone lines, because they further the primary purpose of the highways but no difference in the status of power and light, and telephone lines in this respect has been recognized, even though either one might claim that to a certain extent it furthers the primary purpose of the highways.

One legal authority has stated, "the persons using the streets are not citizens but licensees, and each one holds his rights in subordination to those of the public and other licensees." Decisions have been based upon public need in cases

where granting a utility company the rights of priority might prevent the development of a service much needed by the public. If, granting a company gives such service, the right to use a highway prevents the use of it by the prior occupant its service should of course, be of greater value to the public than the service of the prior occupant. It is probable that communication with neighbors and nearby towns is more valuable to those who live in rural districts than power and light service, because substitutes for the latter service are more easily obtainable.

It has been argued that telephone companies should not be compensated for changes made in their line in cases where the value of these lines is increased, that is, where a useful addition is made to the telephone plant. This is reasonable, if the increased value is one which is desired by the subscribers. If telephone lines are already transposed to prevent cross-talk, changes in transpositions in order to prevent interference from a newly constructed power transmission line can not be said to increase its value to the subscribers. In newly developed territory grounded telephone lines might be regarded as standard. That is, they furnish a balance between the quality of service desired by the subscribers and the rates they are willing to pay. If to eliminate interference, a telephone company were forced to pay the cost of the addition to the plant the addition might not result in an improvement in the service, or if there is a betterment in service in making the circuits metallic, the betterment might be of no value to the subscribers as they do not desire the better service and do not want to pay for it. Incidentally the increased rates might curtail the development of telephone service, and be contrary to the public need.

On the other hand, forcing the power and light companies always to pay the cost of changing the telephone lines to eliminate interference, would make it possible for telephone companies which might gain prior occupancy of a highway by constructing the cheapest kind of lines, to obtain well constructed lines at the expense of a power and light company which might later wish to build its transmission line along the same highway.

Courts have held that the later occupant should pay the cost of changes in the telephone lines to prevent interference even in cases where grounded telephone lines were used by the prior occupant, although, there have been occasional decisions where part or all of this cost was borne by the telephone companies.

If the power and light companies which seek to construct their lines along highways already occupied by telephone lines were never required to pay the cost of the changes in the telephone lines necessary to eliminate or prevent interference, there would be no check upon them to prevent frequent and irresponsible changes in their circuits, which would result in continual work on the lines of the telephone companies in order to preserve the quality of their service.

Those who wish with as little effort as possible to obtain a good perspective of the inductive interference situation are referred to the following articles and reports:

Some Problems of Inductive Interference, by A. H. Griswold, L. P. Ferris, and R. W. Mastick. Journal of Electric Power and Gas, April 15, 1916. Telephone Engineer, May, 1916.

Induction from Alternating Current Railroads, by H. S. Warren, Proceedings of American Institute of Electrical Engineers, April, 1918. Telephone Engineer, Sept. and Oct., 1918.

Final Report of the Joint Committee on Inductive Interference of the Railroad Commission of the State of California. San Francisco, Cal. Sept. 28, 1917.

Cross Talk and Inductive Interference, by C. A. Wright. The Ohio Telephone News, June, 1920. Engineering Extension Bulletin No. 6, of the Ohio State University, June, 1920.

Inductive Interference, by C. A. Wright. The Ohio Telephone News, June, 1919. Engineering Extension Bulletin No. 3 of the Ohio State University, October, 1919.

Interference—Its Legal Status, by J. W. Whitlow. Telephone Engineer, June, July and August, 1918.

The Legal Phases of Interference, by H. L. Beyer, Proceedings of United States Independent Telephone Association, 1916. Telephony, Feb. 24 and March 3, 1917.

Decision and Order of Board of Railroad Commissioners of the State of Iowa on Electrical Interference between Transmission Telephone and Telegraph Lines. December 30, 1916.

Robstown, Tex., to Make Many Improvements.

Robstown, Tex.—R. F. Henry, owner of the Robstown Telephone company recently visited here to overlook the improvements being made in the exchange and outside equipment. A recently purchased exchange building is being remodeled and extensive work is being done on the outside plant.

Waxahachie, Tex., Starts On Work Stopped by War.

Waxahachie, Tex.—Word has been given to proceed with extensions and improvements on the local telephone system. Much of this work was planned before the war and was held pending improvement in telephone business conditions.

It Must Pay—Bond Issue Is Sidetracked for Stock.

New Castle, Pa.—Further issues of stock and not the proposed $32,000 bond financing will supply the Citizens' Telephone company with funds for its construction work. The company's stock is held locally.

Richford, Vt., Chesty About New Equipment.

Richford, Vt.—A new switchboard and terminal equipment at the Richford office of the Northern Telephone company have been made subjects of good local newspaper publicity. The Kellogg board and the Cook terminal equipment got news mention that showed the subscribers their company was on the job in buying equipment to handle the business.

St. Louis Radio-Phone Service Big Hit With Farmers.

St. Louis, Mo.—Radio telephone service operated by the department of science of the University of St. Louis is proving a boon to farmers in Missouri and Illinois, within a radius of 275 miles. Weather and river stage reports are sent out at 10 a. m. and crop report summaries at 2 p. m. The government is to loan communities receiving sets for availing themselves of this service. These sets are in great demand.

Independents Set Nov. 15-18

Big Meeting of United States Independent Phone Association to Mark Silver Anniversary of the Organization---Hotel Sherman, Chicago, the Place

Chicago, Ill.—November 15, 16, 17, and 18 have been set as the days for the silver anniversary of the United States Independent Telephone Association. The twenty-fifth annual meeting is to be held at the Sherman Hotel, Chicago.

From indications at present it is expected to have an array of exhibits that will mark a new epoch in telephone history. All that is modern in the science of telephony will be displayed. Many new ideas will make their debuts.

A longer time than usual has elapsed since the last meeting. The coming convention has been gathering momentum for some time. The field has been eagerly awaiting the announcement of the date and the place of the meeting. Under any circumstances a record breaking attendance might reasonably be expected, but with the inducement of fare and a half for round trips to Chicago, the Independents expect that delegates will come from all corners of the land. Application already has been made for this reduced rate from railroad passenger associations.

The program as tentatively outlined promises to richly repay every convention visitor. Practical papers from acknowledged authorities are to cover each phase of the industry. High tension interference will be one of the featured subjects. Treatment of this important matter will be handled thoroughly and it is expected that the efforts now being devoted to a satisfactory solution of interference problems will be given a great impetus by the Independent association's convention.

Arrangements are being made to take good care of the entertainment details. Special attention is to be given to the ladies.

A glorious history has been made by the Independent association in its twenty-five active years. It faces today's difficulties with an array of stellar talent on its roster.

Officials of the United States Independent Telephone association are: F. B. MacKinnon, Washington, president; Frank L. Beam, Mt. Vernon, O., vice-president; J. B. Earle, Waco, Tex., vice-president; W. S. Vivian, Chicago, vice-president; C. C. Deering, Des Moines, Ia., secretary-treasurer.

The directors are: A. F. Adams, Kansas City, Mo.; Terry W. Allen, St. Louis, Mo.; F. L. Beam, Mt. Vernon, Ohio; W. G. Brorein, Tampa, Fla.; W. H. Bryant, Mobile, Ala.; H. L. Beyer, Grinnell, Ia.; H. D. Critchfield, Chicago, Ill.; C. C. Deering, Des Moines, Ia.; J. C. Duncan, Knoxville, Tenn.; J. B. Earle, Waco, Texas; J. B. Edwards, Chicago, Ill.; H. F. Farwell, Terre Haute, Ind.; Geo. R. Fuller, Rochester, N. Y.; H. L. Gray, Kansas City, Mo.; E. D. Glandon, Pittsfield, Ill.; W. F. Goodrich, La Crosse, Wis.; S. M. Heller, Louisville, Ky.; L. E. Hurtz, Lincoln, Nebr.; Frank A. Knapp, Bellevue, Ohio; F. B. MacKinnon, Washington, D. C.; W. Roy McCanne, Rochester, N. Y.; C. Y. McVey, Columbus, Ohio; Albert Parlett, Bristol, Tenn.; H. Linton Reber, St. Louis, Mo.; G. W. Robinson, St. Paul, Minn.; E. D. Schade, Johnstown, Pa.; C. E. Tarte, Grand Rapids, Mich.; W. H. Trimm, Fort Dodge, Ia.; W. J. Uhl, Logansport, Ind.; W. S. Vivian, Chicago, Ill.

B. H. Brooks, Ohio State Man, Goes to New York.

Plattsburgh, N. Y. — Burton H. Brooks, for the past 12 years, chief engineer of the Ohio State Telephone company of Columbus, O., has been appointed general manager of the Mountain Home Telephone company. This company's territory covers more than 10,000 square miles in northeastern New York — practically the entire Adirondack resort region.

Delphos, O., Company Adds $25,000 Capital.

Delphos, O., Capital of the Delphos Home Telephone company has been increased from $75,000 to $100,000.

Illinois Independents Begin Absorbing Bell.

Jacksonville, Ill.—Work of consolidating the Illinois and Bell telephone companies is well under way here. Bell equipment eventually will be removed.

TURNER BUYS.

E. O. Turner of Pattonsburg, Mo., Buys Daviess County, Mo., Telephone Company.

Gallatin, Mo.—For a reported consideration of $40,000 the Daviess County Telephone company, has been bought by E. O. Turner of Pattonsburg, Mo.

Mr. Turner, who is now at the head of the Pattonsburg Telephone company, owners of the Pattonsburg, Jameson and Coffey exchanges, is an experienced, practical telephone man. He was among the first business men to enter the independent telephone field, taking up this business back in 1895, and has been actively working at it ever since, building and operating independent plants in many different localities. Over five years ago he went to Pattonsburg and acquired the Pattonsburg evchange. Later he purchased the Jameson and Coffey exchanges of the Jameson Telephone company, and has consolidated these plants under the one company management.

Mr. Turner will move his headquarters to Gallatin on acquiring ownership of the local telephone plant, and will give his personal attention to directing the service and making improvements.

Mr. Turner has leased the present quarters occupied by the telephone central for a term of years, the three story building in which it is located, being the property of Mr. Penn Love, president of the company and was not included in the deal for the system.

A Million More to be Spent in Michigan.

Detroit, Mich. — Directors of the Michigan State Telephone company at the last quarterly meeting approved the expenditure of $1,136,000 for new equipment. This makes an expenditure of $3,335,000 authorized thus far this year.

Conquest of No Man's Land

Across Blazing Deserts, Flooded Valleys and Snow Capped Mountains the Indomitable Construction Gang Works--Heroes on Watch

By E. A. J. Seddon

El Paso, Tex.—It is only a comparatively few years ago that the first telephonic conversation between Chicago and New York, a distance of one thousand miles, was heralded as a great event—and it was. Since that time the persistent and unadvertized research work of telephone engineers, has just recently brought about another marvel. They have put the island of Catalina, lying in the Pacific Ocean in the telephonic communication with the Pearl of the Antilles—a distance of five thousand six hundred miles. If one draws roughly a diagonal line across the United States from the southwestern corner to the northeastern corner or from Los Angeles to New York City and thence down the eastern seaboard to the extremity of the Florida peninsular and along the daring marine railroad to Key West and then under the warm waters of the Gulf Stream to the island of Cuba you have the general route over which the telephone engineers caused the vibration of the human voice to travel and at either end a triumph of the telephone art—at the western end wireless telephone communication between an island and the mainland and at the eastern end the submarine telephone cable connecting the mainland with an island of the tropics—truly marvelous achievements.

Romance in the Work.

Considering the achievement as a whole it ranks with the major ones of modern times, but like all great achievements it is the result of a great amount of labor which does not lack the romantic or even tragic. However, these features are behind the scenes, as it were, and are not generally known.

The telephone, very naturally, at first multiplied most rapidly in the densely populated areas and then nearby areas were linked together by longer lines and these lines lengthened as equipment was perfected and the problems of long distance transmission solved one by one. In this way the East, Middle West and South became more or less linked together and the Mississippi Valley was somewhat imperfectly in telephonic communication with the Atlantic coast. In a similar manner the telephone industry was developed on the Pacific slope.

The "Lean" Region.

But between the Pacific Coast and the Western States was the vast "Mystic Mid Region" of the Rocky Mountain States extending from the Canadian to the Mexican borders and comprising an area more than one fifth of that of the entire United States. This is a "lean" territory from the telephone business standpoint because of the great thinly populated areas and great distances of rough and rugged country. The entire population of this area which is covered by the Mountain States Telephone and Telegraph Company is only a little greater than that of the city of Chicago. This Rocky Mountain Region with its mile high plateaux and its mountain peaks reaching higher another mile, with its rocky gorges, stormy passes and blazing deserts remained for many years a realm of silence between the East and West. During the past two decades telephone systems have been developed and expanded within this region, and the more important centers more or less imperfectly linked together until within very recent years.

With the development of the telephone repeater and its practical application, imperfect though it may be, but which nevertheless is the result of many years effort, and if its story was fully told would be a romance in itself—the whole United States was linked together under a network of wire extending from ocean to ocean and border to border. From the Mississippi Valley eastward this net work is woven closely together but to the west the mesh becomes more widely separated until in the heart of the Rockies there are only a few strong strands linking the closer fabric of the Pacific coast.

With St. Louis as a starting point the transcontinental telephone lines pass through Kansas City, Wichita, Garden City, Denver, Cheyenne, Rawlins, Salt Lake, Winnemucca, to San Francisco or through Omaha, North Platte, Cheyenne, Casper, Billings, Butte, to Portland. There is also an alternate southern route from Denver through Las Vegas, El Paso, Phoenix, to Los Angeles. Repeater stations are installed at

A Construction Crew Breaking Camp. The Ubiquitous Ford and the Stalwart White Share Pot-Luck with the Continent-Conquering Construction Gang.

each of the foregoing mentioned places. The repeaters are so designed as to work most effectively when placed approximately 300 miles apart, but the distances between some of the towns mentioned exceed this distance considerably; for instance, the distance between Phoenix and Los Angeles is more nearly 500 miles which constitutes a weak link in the Southern route, however, future development will undoubtedly remedy this. In many respects the southern route is the more interesting as it crosses over mountain passes 8000 feet above sea level and over the high plains of northern New Mexico into the Rio Grande Valley and then down on to the sunbaked desert of Southern Arizona and into the Salton Basin of the Southern California desert and 200 ft. below sea level, making a difference in elevation between the New Mexico mountain passes and the southern California desert nearly two miles.

At the present time transcontinental traffic takes the more northern routes as these have been constructed especially to care for through traffic, being older lines and passing through more thickly settled sections which are favored with a greater abundance of water than the Southern desert country. It is expected, however, that because of the more favorable all-the-year round weather conditions the Southern route will eventually become one of the most important of the transcontinental lines. There is a gap at the present time of about 400 miles in western Texas which is not yet bridged with any long lines. When this gap is closed Dallas will be directly linked with El Paso and connected to a through line to the Pacific coast.

Phones Keep Pace.

The States of New Mexico and Arizona are the fourth and fifth largest states in the Union, respectively, and have a combined area of 236,590 square miles which is nearly twice that of Great Britain and Ireland, and a combined population of approximately 700,000 or a population density of about two persons per square mile. The state of Illinois has a population density more than 50 times greater.

There are 48,000 telephones within this area which includes El Paso, Texas, as in all respects except politically; El Paso and that portion of Texas west of the Pecos river is more closely related to New Mexico than to Texas. Three-fourths of these telephones, or more accurately, 72% are in the nine towns of El Paso, Tex., Phoenix, Ariz., Albuquerque, N. Mex., Tucson, Ariz., Roswell, N. M., Las Vegas, N. M., Bisbee, Ariz., and Douglas, Arizona. Of these El Paso has 13,200 telephones, Phoenix, 8,000, Albuquerque 3,600, and Tucson 3,500. The remainder are from 1,000 to 1,500. In this area there is an average of one telephone to every five square miles and one telephone to every twelve people. It is, therefore, seen that in spite of the "lean" territory covered the telephone "saturation" has kept pace with the rest of the country. All the exchanges mentioned are equipped with the latest up-to-date apparatus and the outside plants, constructed according to the best standard modern practice.

The toll line wire mileage for New Mexico and Arizona is 16,407 miles and the pole mileage is 3,681 miles. Therefore, it is at once apparent that the toll lines are not bunched up in heavy leads but rather strung out in length. These lines are not usually noticed by the casual traveller for the reason they do not always follow the railroads, nor even the main travelled roads but frequently cut across country and in many cases across country that is inaccessible to even the ubiquitous "flivver."

There is nothing unusual in these lines except their length. The line crossing New Mexico and Arizona is more than one thousand miles long. The entire line was not constructed at one time but was extended as important centers were developed and linked together. All lines have been surveyed, staked and rights of way secured before construction work was begun. In many cases rights of way have been secured from the Federal Government as there are still great tracts of land not yet taken up by private individuals. Most of the work has been done by camp gangs as there is no other way to provide for the accommodations of the men. In some cases camps were fifty miles from the nearest water and it was not infrequently necessary to haul supplies and material even greater distances than this and in mountainous regions where there were no roads it was necessary to transport everything on burros. Horses and mules were at first used for transporting material over rough country, but the humble burro, a true pioneer of the Rocky Mountain region, proved the most satisfactory. The Mexican peon has at least two accomplishments, one, that of living off an apparently barren desert country and the other his ability to pack and manage a burro, who also thrives in a country where a horse would wear himself out and starve to death. The construction foremen wisely let the Mexicans have it pretty much their own way when it came to transporting material and supplies. over the rough sections. To see a diminutive burro sandwiched between two 25 foot poles working its way unconcernedly along a rough mountain-side was something at which to marvel. Cross-arms, insulators, wire, all heavy stuff, as well as camp supplies were packed many a weary, strenuous mile in this manner. The Mexicans, for the most part on foot, hissing at their charges in their peculiar way and talking to them vol-

Slim Picking for Man and Beast, but the Boys String the Wires Across the Barren Waste Unmindful of Inexpressible Hardships and Peril.

nably in a most atrocious manner, throwing rocks at those which had a tendency to wander and helping extricate an animal in difficulties with the aid of a good mesquite club, got the stuff through. A white man couldn't have done it as the burros don't sabe English and pay no attention to it. In very few cases was it found necessary to clear the right of way although on some mountain sides a thick forest of scrub trees were encountered and being tough and spreading they were hard to get at. In some of the northern passes where the air currents are strong, attaining the velocity of an almost perpetual gale the poles are short and stumpy and are set as close as fifty feet apart and storm guyed at every pole in the most exposed places.

Water Spans Without Water.

In laying out a line consideration is always given to "dry washes" or the natural drainways for although they may be perfectly dry for months or even years in succession there will come a time when they will be ruthless, raging torrents and for this reason special long spans are constructed for apparently no reason at all. Rains in these regions when they do come usually are torrential and the ground being rocky or sunbaked adobe mud does not absorb the water which piles up and rushes down the natural drainways in a most devasting manner. Frequently these flood waters find their way onto desert flats where they form shallow lakes of a large area but which dry up in the course of a few weeks. Thus it is seen that the building of the desert toll lines is an expensive undertaking, especially when it is considered that all material had long rail hauls from manufacturing centers one thousand to two thousand miles distant and even more, in addition to the local laborious hauls. It needed a resourceful progressive organization having foresight and confidence in the development of the country to string these lines of communication across great reaches of uninhabited country which mean so much to the general commercial success and development of any section.

The value of any line is, of course, in its continuity of service. No matter how well a line may be constructed it is subject to breakdowns and interruptions in service due to various causes and that is where the problem of efficient maintenance enters.

In these sparsely settled regions, small exchanges, where a maintenance man is employed, are frequently one hundred miles apart. Between the exchange at Phoenix, Arizona and the exchange at Yuma, Arizona, the distance is 200 miles, and in all this distance there are no towns and only a few scattered railroad Mexican labor settlements. It is just desert—the hottest section in the United States and one of the hottest in the world, where the thermometer not infrequently registers 120 degrees in the shade and occasionally even higher. Through all this shimmering heat the line stretches for miles and miles across that vast area of solitude and silence.

Trouble Bad on Desert.

The summer season is most dreaded by the maintenance man because of lightning. Lightning is so very uncertain, and invariably, when it strikes the line, does so in the most remote and inaccessible places. Such troubles are not always easy to locate and when a location cannot be made, where distances between exchanges is great, repairmen are started from each end of the line and follow it by the best available means. As the line is sometimes several miles from any road, signs are placed along the nearest road paralleling the line, indicating how far away and in what direction the line lies. Where a definite location of a trouble has been made this greatly expedites matters, especially where the country is rough, as the repairmen can travel the road until he reaches a point as nearly as possible to the location of the trouble. After going as far as possible with the car, and it is remarkable what rough country an experienced trouble-hunting "flivver" can cover, the repairman with his tools, coil of wire and canteen makes the rest of the way on foot. After walking into the line, he follows it until the trouble is found. Not infrequently a repairman is out 24 or 36 hours and occasionally as much as 48 hours. And he is going most of the time for the simple reason there is no place at which to stop and the nearest eating place may be fifty to a hundred miles distant. The desert repairman is alert and resourceful as a matter of necessity and he often appears to accomplish the impossible. After a man has travelled fifty or sixty miles to clear a case of trouble he isn't going to let some difficulty thwart him without making a desperate effort to at least effect temporary repairs. While these faithful, unsung keepers of the long lonely wires occasionally face real dangers and frequently experience exposure and privation they seldom have a serious mishap. They do not take unnecessary chances but when in the line of duty they do sometimes take chances and get by with them. Occasionally a man gets caught in a cloudburst before he can reach higher ground. The natural drainage systems fill up with water in an amazingly short length of time when a heavy rain brakes in the mountains and although a traveller may not have been rained upon he may be overwhelmed by the flood which rolls down from the mountains.

Near Phoenix where the water from the drainage canals seeps out on to an alkali flat, the sun has baked a thick crust of mud over the morass and the unwary motorist who gets off the roadway and breaks through this crust has no difficulty in finding trouble and plenty of it. It, therefore, behooves the traveller to know something of the country over which he

The "Rocky Mountain Canaries" Plod Along Under Burden, Spurned by the Mexican Masters of Verban and Physical Arguments for Questioning Burros.

travels. However, difficulties caused by heavy rains and high water are not prevalent as it may be from two to five years or more between heavy rains or cloudbursts. Good weather is the rule in the southwest and with the exception of high, but not disastrous winds and sand storms in the spring months, weather conditions are as nearly ideal as possible. The sand storms produce, what the maintenance men term, "sand static" which render long lines extremely noisy. However, as all the important toll lines carry grounded Morse circuits, the static is drained to the ground. Those lines which do not carry Morse are grounded through resistance coils during the sand storms.

Here a Man's a Man

An efficient maintenance department anticipates troubles before they materialize. This is, of course, accomplished by keeping the plant in a first class condition and the best way of doing this is by a periodic inspection. This is done either by men who are stationed at strategic points patrolling a given section of the line periodically or by men who devote all their time to patrolling a certain section of the line. For instance, the toll lines in New Mexico are patrolled by one man and a helper, who spend all their time going over the lines. Their route is more than 2000 miles long, not taking into consideration the distance they cover when of necessity they have to double back over a line. The job of a desert section patrolman is no sinecure and he must be a man to the manner born and a man who rejoices in the great out-of-doors and recognizes friends in the mountain peaks, valleys and plains. The patrolman carries all his needs, including camp outfit, in a light truck, replenishing his supplies as he passes through the small exchanges along the route or when occasion demands material is shipped to him at the nearest railroad point. The necessary tools, material, and camp equipment aggregate a pretty good load and sometimes in cases of emergency a pole or two is added. There are a good many places where it is necessary to patrol the line afoot, in which event the helper detours along the road to meet at some agreed upon spot. Perhaps in the region of the sand dunes the patrolman's work is the most arduous. In some cases the sand drifts have almost buried the line the sand reaching within a foot or two of the wires.

The patrolman camps wherever night finds him, whether it be ten or fifty miles to the nearest habitation and it takes him from three to four months to cover his route. Working alone and usually far from assistance develops initiative, alertness, resourcefulness and care on the part of these men. They have a keen sense of duty and stay on the line until they get their trouble. Along the northern routes where the winter snows are heavy in the mountain the men cover the line on snow shoes and in the remote and exposed regions cabins are located where caches of food and fuel are kept and the men can spend the night in comparative comfort if need be.

Seven Hours Average Trouble.

Considering the great distances covered and the general roughness of the country it is really remarkable the short length of time an important toll line will remain out of service, even when the break is a bad one. The average time for clearing all toll trouble in the Rocky Mountain region is about seven hours, while the time required on the lines in New Mexico and Arizona is only about five hours which clearly indicates that the southern route is more desirable for the transcontinental lines.

The commercial world demands reliable telephone communication and gets it but it is extremely doubtful if the Chicago business man after he has talked to his agent in San Francisco gives one thought as to how it is done nor if he realizes the vast amount of equipment and the perfect organization of operating and maintenance people which are at his service when he removes the receiver from the telephone on his desk. The telephone line of the mystic mid region crossing plains, mountain and desert should be counted among the wonderful achievements of modern industry.

Where the Sun Devils Dance Men to Madness a Lonely Figure Patrols His Beat that Manhattan May Talk to the City of the Angels.

PLATINUM'S STORY.

Experts Write Interesting Little Treatise On Precious Metal.

Newark, N. J.—Baker and company, one of the foremost authorities on platinum, have prepared a vest booklet on platinum which has much of interest to the scientist, business man and student.

The Baker booklet gives a historical summary of platinum, from the date at which it was first referred to —1600. The occurrence of platinum ore, the platinum metals, and the uses of platinum, its allied metals and alloys, are the other phases treated. This condensed story of platinum is a classic of readable business literature.

Information of a more technical nature is given in the Baker and company publication, "Data Concerning Platinum", which is generally considered to be a standard authority on this subject.

Number Missing—Wants Whole Directory Republished.

Denton, Tex.—A local telephone subscriber has brought suit against the Peoples' Home Telephone company to enforce republication of the current telephone directory from which his name was omitted.

OPINIONS AND COMMENTS

THE MUSKETEERS

"All for one and one for all", the battle cry of The Three Musketeers is a good slogan for a telephone organization. It seems to be the way they work in the Northwestern Bell. Frank Builta, publicity manager of the company, makes this comment on a TELEPHONE ENGINEER article telling how that organization gets its advertising across:

"Those of us directly interested in the public relations work of our company appreciate greatly the article you gave us in the September issue of your splendid magazine. However, you made this mistake: Our relations with the public in our territory are remarkably good, I think, but only a small part of the job has been done directly by the Publicity Department through advertising. It is due to a very large extent to the efforts of all of our employees acting as publicity agents in giving information about our business to every subscriber with whom they come in contact. The employees have been our greatest publicity medium; advertising has held a secondary place. The employees, of course, have been educated through conferences, illustrated lectures, motion pictures, pamphlets, our company magazine, etc."

"Sell your own employees first" has never failed as a corporation policy.

HOPE FOR LITTLE 'UNS.

A well known telephone engineer says that a new era of telephone service will be entered when problems of inductive interference are solved.

The big companies are well on the way to the solution. Team work with light and power companies, specialized engineering talent, and a wad of money are speeding the answer.

But what about the smaller companies and their inductive interference disturbances? Here is where the matter often is particularly acute, and the expert legal and engineering advice expensive beyond reach.

These negotiations between telephone, light and power interests are the hope of the smaller companies. If the conferences are to result in a thoroughly successful solution, the men in the littler companies will give voice to a profoundly thankful prayer.

TAGGING THEM.

Indiana's suggestion that telephone companies be classified for rate making purposes has met with a favorable reception throughout the industry.

In making these classifications, number of telephones, character of the area served and service are to be considered.

Here is where the company that has been giving good service in every respect stands a chance to get some reward for its effort. There are plenty of companies that have been doing superhuman work in serving despite every handicap. They have wanted money to bring their plants up to date, but lacking the ready cash, and being unable to get it, have made men and women inject a pleasant human element so strongly into their relations with their subscribers that mechanical handicaps often have been overlooked.

With the Indiana idea at work these resourceful and hopeful workers get a chance for rates that will be a reward.

TELEPHONE ENGINEER

Vol. 25 October
No. 4 1921

Entered as second-class matter at the postoffice at Madison, Wis., under the act of March 3, 1879.

Office of publication, 114 South Carroll St., Madison, Wis.

General Business and Editorial Offices, 28 E. Jackson Blvd., Chicago, U. S. A. Telephone: Harrison 4000.

W. H. Graffis.....Gen. Mgr.
Herbert Graffis.....Bus. Mgr.
Jos. M. Graffis.....Advertising Mgr.
E. Klappenbach.....Eastern Mgr.
56 W. 45th Street, New York
Tel. Vanderbilt 3695

SUBSCRIPTIONS

The subscription price of TELEPHONE ENGINEER is $2 a year in the United States, Cuba and Mexico; in Canada it is $3; in all other countries, $4; single copies, U. S. A., 20 cents.

ADVERTISING

TELEPHONE ENGINEER is issued the 15th of each month. Copy can be accepted as late as the 8th of the month preceding date of publication. Where proof must be seen, allow ample time for transmission in the mails. Display Advertising—Rates on application. Classified Advertising—"Wants," "For Sales," etc.—$4 an inch, or 7 cents a word per insertion.

HOLD FAST!

Attempts are being made to take from telephone companies the dearly won rate increases of the last few years. The many telephone men who consider monthly statements and then sweat blood at every pore view this prospect of a reducing treatment and murmur, "Oh, Death, where is thy sting?". The matter is one of political expediency entirely. Against a well prepared case the grand-standing demagogues haven't a ghost of a show. It's not so difficult for the larger companies with their able staffs of specialists to present the truthful array of facts and figures that maintain their position, but the smaller company is face to face with a stiff battle for which it is too frequently unprepared.

TELEPHONE ENGINEER staff writers have met these rate issues squarely and successfully. They are at the service of the companies that have to cope with rate issues and need help in the battle.

It's been ages, it seems, since the last independent convention, but the silver anniversary of the United States Independent Telephone association scheduled for Chicago, November 15-18 will make up for lost time.

QUESTIONS AND ANSWERS

Conducted by W. N. Furthman

This department will be devoted each month to our subscribers who may require expert advice on special topics, now and then. All of the questions submitted will be answered each month as they are received. If the questions require an answer of some length it will be necessary to furnish the subscriber with a special statement. In requesting statements of this kind self-addressed envelopes should be enclosed with the request. Special attention will be given in the column to engineering questions, particularly testing of all kinds, purchasing requirements, specifications, appraisals and rates.

Condenser Depreciation.

Q. I have noticed in testing our various circuits that our condensers depreciate in capacity. I have also found that condensers depreciate upon the shelf. Please advise us if a condenser has been made which will not depreciate.

Ans. Depreciation in capacity occurs not only during the life of the condenser on the shelf but also in service. This is primarily due to the kind of paper that is used in manufacturing condensers. A condenser is now under development which will not depreciate, it is said.

Moisture-proof Cables.

Q. Along the Western Coast of the United States we are having considerable difficulty in obtaining a moisture-proof switchboard and lead covered cable. Please advise us of the latest developments of cable of this kind and whether or not they can be readily purchased on the market to-day.

Ans. It is a very difficult problem to manufacture cable that will be water-proof and not increase its capacity requirements. It has been determined, however, by using black enameled wire in cables of this sort that a very high degree of water-proof quality may be obtained without in any way sacrificing any other electrical requirements of the cable.

Water-proof Cords.

Q. We have been purchasing water-proof cords which are only giving us a certain amount of satisfactory service in this location. The cords we have been using are water-proofed by treating the outer layer of the insulation. Advise us if you know of a standard product wherein the conductors are treated before the outer insulation is applied.

Ans. Cords are produced that are water-proofed in the method you describe and are giving highly satisfactory results. We do not propose to furnish the names of manufacturers of various products discussed in these columns, but will be pleased to send you this information under separate cover.

Long-lived Ignition Coils.

Q. We are using automobile trucks in our construction and repair work and we find that the fibre coils in the ignition system are destroyed very rapidly by moisture and oil. Do you know of a manufacturer who produces an ignition coil which is water-proof and oil-proof?

Ans. Nearly all of the ignition coils used not only in pleasure cars but also in automobile trucks are made out of fibre. Fibre absorbs moisture and oil due to its porous construction. By baking such coils in an oven for two hours at a temperature not over 140 degrees Fahrenheit the moisture may be removed. It is impossible, however, to remove the oil in a fibre case. A bakelite ignition coil is now being manufactured which is guaranteed for the life of the car or truck and you are being advised under separate cover of the price of such a coil and where it may be obtained.

Lowered Wages and Rates.

Q. We are about to apply to the Utility Commission in our state for an increase in rates, but due to the rapid decrease in labor and material that has taken place in the past six months we would like to have your opinion as to whether or not such a decrease in labor or material at this time would prevent us from obtaining a proper rate for our service.

Ans. An appraisal of your plant would take into consideration the material costs and wages which were paid over a large number of years. An average price and cost would be determined upon as proper rate making information. While it is true that wages and material have decreased within the past six months this decrease would not materially affect an appraisal of property which had been in service three or four years, and in our opinion therefore would not prevent you from obtaining a proper rate for your service at this time.

Decreasing Insurance With Flame-proof Wire.

Q. We have been advised that by using flame-proof wire we can materially decrease our insurance rates. We have tried several types of so-called flame-proof wire which we found, upon submitting to the insurance company, did not meet with their requirements. Do you know of a manufacturer who is producing a flame-proof wire that will have the approval of standard fire insurance companies?

Ans. There is a flame-proof wire now being manufactured by several companies, the basis of the flame-proofing specification being the use of wolframite. This wire should have the approval of the National Board of Fire Underwriters. We are furnishing you the price and names of these manufacturers under separate cover.

Cross-talk Elimination.

Q. We have found that cross-talk exists between the wires of a pair not only when they are twisted together as subscribers lines entering the exchange but also when they are pairs of a cable of 120 capacity. Can this cross-talk be eliminated at the distributing frame?

Ans. Cross-talk in the pairs of a cable when not due to poor insulation may be eliminated at the distributing frame by balancing the pairs for resistance, capacity and inductance. This may be accomplished by adding a special resistance wire to the wire of lower resistance when measured with a sliding wire bridge. This wire may be purchased on the open market from an alloy wire company of this country. The name will be furnisned you under separate cover. This alloy wire has a specific resistance of german silver and a temperature co-efficient of copper.

Synchronous Motor for Rectifier.

Q. We have endeavored to purchase a mechanical rectifier for charg-

ing our storage batteries. We find, however, that these rectifiers do not keep in step with changes in the line circuit, and they are not, therefore, satisfactory. We would appreciate it if you would inform us of a manufacturer of a rectifier who puts out a product free from this defect.

Ans. Their chief difficulty with the use of a mechanical rectifier lies in the fact that it is not attached to a motor that is truly synchronous. There are a number of manufacturers who claim they produce a synchronous motor but upon testing it is found they are not perfect in this respect. We are advising you under separate cover the name of a concern which produces an absolutely synchronous motor that we feel will give you positive satisfaction with the use of a mechanical rectifier for charging storage batteries.

Cable Sheath Alloy.

Q. We have noticed in one of your articles that you describe a substitute for a sheath for underground cable that is as durable as the lead tin sheath now used for this purpose. We would like to know the composition of such a sheath and where it can be purchased.

Ans. The sheath for underground cable described in an article in TELEPHONE ENGINEER of last February is composed of 99% lead and 1% antimony and is considered as reliable as the lead tin sheath having 97% lead and 3% tin. We are sending you under separate cover descriptive bulletin of a sheath of this type together with full manufacturing information as to where it can be purchased. We do not print the names of manufacturers in this department.

Hard Rubber Substitutes.

Q. Do you know of a suitable strong substitute for hard rubber?

Ans. Pure hard rubber has not been used in the manufacture of telephone apparatus for a good many years. The first substitute for hard rubber was known as a sulphur compound rubber mixture containing about 40% of hard rubber which is vulcanized in sheets or molded. Even this substitute for hard rubber has now become so expensive that it is necessary to find a substitute for it. The substitute now generally used in the insulation field is called bakelite. The basis of this composition is sulphuric acid and formaldehyde. We are sending you under separate cover booklets on this material suitable for telephone apparatus insulation.

Non-Ring-Through Coils.

Q. We have purchased from time to time repeating coils which were sold to us as non-ring-through repeating coils. We find upon testing these coils with a lamp on the non-ring-through side that considerable current leaks through them. Please advise us if you know of a non-ring-through type of coil which you can recommend for our purpose.

Ans. We do not know of any coil now in the market which will meet your specifications. While some types of so-called non-ring-through coils are satisfactory in the circuits on which they are used, all of them which I have tested have shown some leakage. In the very near future a manufacturer hopes to produce a coil of this kind. At that time we shall be pleased to advise you further in regard to it.

Running Generator Leads.

Q. We have found considerable disturbance due to the method of running generator leads in our switchboard keyboard cable. Please advise us how this disturbance can be eliminated.

Ans. This difficulty cannot be eliminated as long as the generator leads are laid up in the keyboard cable. Generator leads should be run in over a cable entirely separated from the keyboard cable.

Wheat Chaff Grounds.

Q. We are having considerable low insulation troubles on some of our circuits. This difficulty is noted particularly where the lines pass through a field in which farmers are thrashing wheat. Do you know of any method of eliminating this difficulty?

Ans. This trouble cannot be eliminated by means of the ordinary glass insulator, due to the fact that the chaff from the wheat covers the insulator in such a manner that it offers continuous ground on the line extending not only over the insulator but also over the cross arm and the pole itself so that it is carried to ground by means not only of the pole, but more often by the pole guy wire. Provided this difficulty is found over a large area in the district in which you operate, it is suggested that an insulator be installed which is made up with what is known as an overlapping petticoat. With an insulator of this type it is impossible to obtain what is known as a continuous ground as the petticoated insulator breaks it up in several places.

Multiple Fuses.

Q. A new type of telephone fuse has been called to our attention which enables a repairman to obtain a new fuse by turning a brass cap on one end of the fuse which engages four or five fuses in multiple as required. Do you consider such a fuse reliable and fool-proof?

Ans. We know of such a fuse and are advised that it has always obtained the approval of the Fire Underwriters in commercial work, although we have never observed it operate in telephone service. From tests which have been made in the laboratory I believe that such a fuse would be found satisfactory for telephone purposes since it can be mounted on the same centers as the standard fuses used in the regular lightning arresters. We have requested the manufacturer of these fuses to send you complete information in regard to them.

Pole Preservation.

Q. In our territory we find that poles deteriorate very rapidly in that section which is above the ground. We also find that certain insects destroy cross arms very rapidly. Do you know of a method of treatment which will overcome this deterioration and be satisfactory for the climatic conditions in our territory?

Ans. The Forestry Department of the U. S. Department of Agriculture has completed an extensive series of tests on the preservation of poles and cross arms for telephone and telegraph purposes. These tests and investigations have been exhaustive and thorough and we would suggest that you write the Forestry Department for copies of the bulletins which they have issued as a result of their studies, extending over a considerable number of years. We are sure that in these bulletins you will find complete information for overcoming this trouble.

Battery Leads and Cross-Talk.

Q. We have been advised that a considerable amount of cross-talk in telephone exchanges can be traced to the battery leads and the method of installing them. We would like to have you advise us of your opinion in this respect.

Ans. Battery leads are responsible for a considerable amount of cross-talk in telephone systems. The method of overcoming this trouble consists in using leads of equal length to the boss-boards. This method of running leads of equal length to the boss-boards is very important even though the difference in length may at times seem insignificant. We are sure that if the method of distributing the battery leads is uniform and the lengths of the leads equal you should have no further trouble due to cross-talk in these leads. We have found that this method of running battery leads will

clear up cross-talk, the source of which cannot be located in any other manner.

Alloy Wire Maker.

Q. I would like to obtain the composition of an alloy wire which has the temperature co-efficient of copper and the specific resistance of german silver.

Ans. An alloy wire of this composition is readily obtainable and we are sending you under separate cover the name and address of the manufacturer. We have found the wire of this composition to be very satisfactory in the reduction of cross-talk in telephone apparatus cable and circuits.

"By-Product" Data.

Q. We would appreciate it if you would send us detailed information of any by-products of the telephone business.

Ans. There are three natural by-products of the telephone business, namely, fire alarm, burglar alarm and local stock quotation service. In accordance with your request we are sending you detailed information as to the operation of such systems on spare pairs in your telephone cable and complete descriptive matter in regard to same.

Megger's Dependability.

Q. Do you recommend a Megger as a reliable instrument for making insulation tests?

Ans. The writer has made a large number of important insulation tests involving the use of loading coils in underground cable and has at all times found that a Megger is a most satisfactory instrument. We are sending you under separate cover detailed description of this instrument, together with full directions as to its use.

Ford Magnetos for Testing.

Q. Please advise us of the frequency of the current as produced by the magneto on Ford trucks and whether such current can be changed satisfactorily so that it can be used in making effective resistance and inductance tests.

Ans. The frequency of the magneto generally furnished with the Ford engine has been determined by means of an oscillograph to be approximately 340 periods per second. In making this oscillogram it was noted that the wave contained several high harmonics. These harmonics, however, were readily eliminated by means of a wave filter. From open field work that has been carried on by means of this magneto when equipped with wave filters, it can be said that it is entirely satisfactory for the purpose.

Transmission Tests.

Q. We have had occasion to test three different makes of repeating coils for transmission range. These tests were made by the same party on the listening side of an artificial cable set up in the laboratory. Can you advise us of a more sensitive method of carrying on transmission tests in telephone exchanges?

Ans. In making transmission tests using only the voice as a means of determining the various grades of telephone apparatus only comparatively satisfactory results can be obtained. This is primarily due to the difference in pitch which may vary considerably, especially in carrying on tests over a long period of time. A sensitive instrument known as a Barretter has been designed which may be used satisfactorily in telephone exchanges for transmission tests. A galvanometer must be used with the Barretter, a base for which must be made that will enable the operator to use the galvanometer without obtaining incorrect results due to vibration of the buildings. We are sending you under separate cover the manufacturer's description of the assembled Barretter and the method of wiring it. Any good standard make of galvanometer may be successfully used with the Barretter.

Cable Bonding Systems.

Q. We are having a number of complaints from the municipal authorities in our city in regard to the pitting and deterioration of water pipes due to stray electric currents. We have endeavored to correct the difficulty by applying several standard methods which are supposed to serve the purpose. We would appreciate any information you could give us which would assist in overcoming this trouble.

Ans. We are sending you under separate cover an outline of a standard bonding system which is used in Chicago and which has entirely overcome this difficulty. We do not know of any reason why this method of bonding cables should not give you very satisfactory results.

Inductive Disturbances.

Q. During the past few weeks we have had considerable disturbance in our telephone circuits which we attribute to electrostatic capacity and electromagnetic induction. Most of this disturbance is located in the heart of the city and we have partially overcome some of the trouble by twisting the wires of the disturbed circuit. This method which we have employed is very expensive but since we have tried every other scheme we would appreciate it if you could advise us of your experience along these lines.

Ans. It is always possible to overcome any inductive disturbance by twisting the wires of the disturbed circuits. As you state, however, this method is expensive for overcoming such a large amount of trouble as you are no doubt experiencing. The writer can think of only one reason why other methods have not been found satisfactory. You will no doubt find upon inquiry from the electric lighting company in your city that they are now using low voltage transformer lamps in the street series lighting. These transformer low voltage lamps are so designed that when a lamp fails a ground occurs in the transformer circuit. This disturbance can be immediately corrected by replacing the defective lamp. A few simple tests carried on in co-operation with the electric lighting company will determine whether or not this is the particular cause of your difficulty. We would appreciate it if you would write us further in regard to the results you obtain in correcting this disturbance.

THRIFT PROMOTER.

Bell Forms Security Company Headed by Houston, Ex-Treasury Chief.

New York City—David F. Houston, former Secretary of the Treasury is president of the recently organized Bell Telephone Securities company.

A statement made shortly after the papers of incorporation had been filed says:

"The Bell Telephone Securities Company will be a subsidiary of the American Telephone and Telegraph Company and the American Telephone and Telegraph Company will own all of its capital stock. The purpose is to disseminate facts about Bell securities among those, especially Bell telephone users, who have been investors and to encourage the habit of investment among those who have not. As a matter of convenience the new company has been formed to carry on the work which the American Telephone and Telegraph Company has always done along these lines."

Hoosiers Hold a Big Meeting

Indianapolis Convention a Success in Attendance and in Interest of Papers Presented---Rate Making, Inductive Interference, Publicity, Employment, Feature

Indianapolis, Ind.—Indiana's up-and-at-'em telephone association hung up another red letter in the calendar of state conventions with its 1921 annual meeting. The largest attendance that ever has featured a Hoosier telephone gathering—250—went into the sessions at Hotel Severin and came out better telephone men, they agreed.

A probable outcome of the convention may be the classification of telephone exchanges in groups, in which the character of the territory served, and the number of patrons, rather than simply the physical valuation, be made the basis for rates. The kind of service rendered also is to be a consideration. The thought of the convention along these lines is to be presented to the public and to the commission for action.

That ever important matter of inductive interference received attention in a resolution to be presented to the commission in which the commission was asked to call a conference of telephone, light and power interests at which interferences with service and hazards could be discussed from A to Z, and some mutually satisfactory conclusions reached. The telephone men assured the commission that they would do their part in arriving at an understanding with other wire companies.

Tips to Commission.

The resolution covering these topics follow:

"That it is the sense of the Indiana Telephone Association in convention assembled that the Indiana Public Service Commission immediately call a conference of representatives of light, power and telephone interests to assist the commission in formulating such rules and regulations as may be advisable relating to the construction and maintenance of light, power and telephone lines in order that hazardous conditions and interruptions to both services may be eliminated and prevented in the future, and this association desires to assure the public service commission, and the public in general, of its readiness to assist in carrying into effect the spirit of this resolution.

"Public utility regulation is now recognized by practically every state in the Union as being essential to the best interest of the public and the investor and this association desires to go on record as fully endorsing public utility regulation. It desires, however, to direct attention to the enormous expense evolving upon the utility, then the user, incident to meeting requirements of the law in preparing and presenting cases and, therefore, most humbly suggests, that, without in any way weakening the powers of the regulatory body, serious thougnt be cast along the line of a more simple and resultant economical plan of procedure and to this end begs to suggest a thorough consideration of some plan of classifying exchanges fore rate-making purposes based upon the area served, population, number of subscribers and service rendered.

"The difference in valuation of plants when measured by the suggestions contained herein would be so slight that a thorough investigation of one exchange under a certain classification should place the regulatory body in a position to arrive at a proper rate at all other points coming under the same class and under a plan of this kind the economics would be apparent.

"Be it resolved, therefore, that these suggestions be presented to the public and the regulatory body for such consideration as they deserve."

President's Address a Feature.

"Tell our fellow citizens what we are up against and they will be fair with us", President Henry A. Barnhart declared. He recommended that a vigorous drive for new members be made, pointing out the fact that there are quite a few companies within the state that are not now sharing the benefits of membership in the association. He referred to the increased force the association would have were its membership a complete lineup of the telephone companies of the state.

Preference for tax-free securities is exacting a hardship and most intelligent work to overcome, Mr. Barnhart stated.

The presidential address advised the members of the association not to pin their hopes on legislation as assurance of success, but to stake their claim on harmonious public relations. He spoke of the injustice of setting 7% as the return in the good years without having a chance for compensation for the long lean years. He called attention to a visit to the exchange as a sure cure for chronic kickers.

In part Mr. Barnhart said:

"Money invested in the telephone business or any utility business, is as justly entitled to earning possibilities as it is when invested in farms, banks, factories or merchandise stores. But, somehow, farmers, merchants, manufacturers and others feel that a public utility is not entitled to the same legislative favor and good will that their business is. They go openly to congress and to the legislature with requests for liberal aid but if public utilities ask for a fair deal for their legitimate and important business, the cry of lobbyists and "the interests" is soon heard and most unfairly broadcasted.

"When farming, manufacturing and merchandising were making big profits, a few years ago, during the war and even before, telephone investors were told to be patriotic and help the general cause by not increasing rates. They were, indeed, held down to a maximum earning of 7 per cent on the capital invested and many of them did not make that.

"Yet those to whom telephone service was furnished were making such big profits that nearly everybody had money to burn. But now that profiteerine is afflicted with consequential gout, so to speak, the demand comes from those who have prospered lavishly that public utilities, which have been denied more than 7 per cent return, shall now have their returns reduced the same as those who have been making 100 per cent profit."

"I have often found," Mr. Barnhart said, "If we can get out chronic complainers into our operating rooms and in the wire chief's headquarters and see all these employes working hard in behalf of good service, it usually

makes friends of our business — and then if the rate opponents will look at our books intelligently and candidly, we will gain more friends, for they will then see for themselves the truth of our efforts to please them and they will also see the progress and losses of our business."

"About the most successful telephone manager I know is the one who permits his patrons to see most of his efforts to give them good service and to see what it costs in labor and money to do it. There is one thing certain in the telephone business—we will never see a time when there will not be plenty of business. More and more people, everywhere, are needing and using the telephone. And more and more people are realizing that if they have good service they must pay the worth of it."

The Governor Honors Them.

Governor McCray of Indiana, paid tribute to the telephone men and their leader in his welcoming address. He set their place as one of vast consequence, representing as they do one of the most vital aids to business and the convenience of life.

George M. Barnard of Newcastle, a member of the Public Service commission, who is being groomed as the republican candidate for gubernatorial honors in 1924, in his address, told of the difficulties of the commission, which were based on ignorance or misunderstanding. He regretted bitterly the failure of many to exercise their privileges as citizens, and to take greater interest in government.

F. B. MacKinnon, president of the United States Independent Telephone Association, who was a guest of honor at the meeting, commented on efforts to come to an agreement on inductive interference, rate making by classification, and abolition of federal taxes on capital stock of public utilities.

Mr. MacKinnon also spoke on the operation of the national association and what it was doing for the telephone industry.

P. J. Maloney's concise paper on "Telephone Leads by Electric Light and Power Companies" was well received and provoked considerable technical discussion in which Prof. R. V. Achatz and Jay G. Mitchell were prominent.

Stopping Hardshells.

John G. Brown of the Indiana Federation of Farmers' Associations found he was with friends when he asked that those present who had been on farms make themselves known. Half of the audience gave evidence of farm origin. He told the telephone men that the farmer had something in common with them. During the war the farmer didn't "get his" as many industries did, and now in the wake of the war he is suffering harsh treatment from falling prices of his products. He said his experience with telephone rate increases had all been on the side of the opposition but he was always willing to listen to reason. He advised the telephone men to get to the hard-shell farmers with their case before matters reached a boiling point and the farmer had declared himself too strongly to back down.

The new law restricting the working hours for girls between the ages of 14 and 18 to eight, and prohibiting the employment of girls within this age range between 7 p. m. and 6 a. m. was the subject of the address given by Mrs. Luella Cox of the Industrial Board of Indiana. This law has upset telephone companies in Indiana was staunchly upheld by Mrs. Cox. It was criticised by the telephone men. Frank E. Bohn of Fort Wayne said telephone men were slumbering at the switch when the law was passed, and that nothing except obedience to the measure should be observed pending a modification by the next general assembly.

Carlo Mote, formerly secretary of the Indiana utility commission said the seven- and eight per cent profit set by the commission for telephone companies during the war was a flight of fancy. Now, he averred, not a few companies are operating at a loss, and in many instances are getting as low as a two per cent return. W. S. Vivian also referred to the financial condition and said if telephone companies were going to keep ahead of the sheriff they must build a strong organization and have it function on an educational basis toward the public.

Community Employment Bureau.

A. C. Lindemuth of Richmond, an ex-president of the national association, spoke of the benefits of association work to the individual, to the company, and to the industry. He put forth a constructive suggestion in proposing a community employment bureau in connection with the telephone exchange. The small investment necessary for such an enterprise and the good will it would gain, to say nothing of the service given, makes this idea worthy of consideration. Particularly with unemployment giving the nation so much concern, does it afford the telephone company an opportunity. A nominal charge could be made the employee and the employer to make such a service self-supporting, according to Mr. Lindemuth.

Practicing strict economy was set forth by W. L. Bott of Rensselaer, as one of the most important duties before the association in these times.

F. O. Cuppy, secretary, and Max Hosea, treasurer, gave the association clean cut reports of their performances during the past year and showed the healthy condition of the organization. The Indiana association is to be congratulated upon the work of these able telephone men. Thousands of dollars have been saved by Mr. Cuppy's work for member companies in cases before the commission, in accord with the association's practice. Max Hosea's activities before the state tax board also has been worth a lot of money to the association members. The administration just ended has set a splendid record in dollars-and-cents value to the membership.

New Directors.

The following directors on the board of 15 have been elected for five year terms: Walter J. Uhl, Logansport; F. R. Strickler, Franklin; Max Hosea, Indianapolis; Frank Wampler, Indianapolis, and W. L. Bott, Rensselear. The directors are to meet to elect officers for the following year.

In practical addresses the meeting gave good value to all who invested their time and money in attending. In addition to the speakers above mentioned, the convention was interested by the remarks of A. H. Hinkle of the State Highway commission, F. V. Newman, A. L. Staderman, W. L. Bott, S. M. Isom, L. W. Conarroe, and L C. Griffitts.

Spokane Rejoices At Phone Users Increase.

Spokane, Wash.—A 3.5 per cent increase in number of telephone subscribers during the first six months of the year is being used by local newspapers as the surest indication of the city's progress. Spokane now has 30,011; a gain of 1,014 in the first half of the year.

Laborites Protest Merger on Rates.

Zanesville, O.—Protest against the proposed Independent Bell realignment in Ohio, has been made by the Zanesville Trades and Labor Council. Claims are made that the proposed capitalization is too high a basis for rate making.

Engineering of Buildings

Some of the Problems which Arise in Planning Sky-Scraper Telephone Service and Providing for Future Growth

By Thomas B. Lambert

The Western Society of Engineers, at a recent meeting, was treated to an interesting paper on "The Engineering of Buildings for Telephone Service" by Thos. B. Lambert, of the Illinois Bell Telephone Co., Chicago. Mr. Lambert reminded his audience that the larger American cities have no parallel in history in magnitude or congestion. Even the exaggerations that have crept into the legends of the past fall short of picturing conditions that now exist in our large centers of population. The very causes that make for and produce the great cities of today, go still further and develop those super-congested business structures which for lack of better words, we have learned to call "skyscrapers." In Chicago, for instance, one single twenty-story building stands on half an acre of ground, in the financial commercial district and houses for employment at least 6,000 people. On the basis of census statistics, this number of employes represents the business district and activities of a city of 30,000 inhabitants. Such buildings are veritable "cities on edge," cities with no vacant lots, every house built and ready for occupancy served with elevators that function as street cars, and halls that serve as public highways. They have complete water, sewer, heating and lighting systems and supply janitor service to the tenants all included in the annual renting charges.

Property Values Enhanced by Telephone.

With all of these community conveniences and necessities, it is interesting to note how little value they would have were it not for the telephone service,—the one thing that makes such congestion possible or endurable. If the elevators should fail to operate, people could walk up and down the stairways, but if the telephone service should be taken away, business in such a building would practically cease until the service was restored. If a building of this type were wholly self-contained, requiring no contact with the outside world, the management could and probably would install and maintain its own private inter-communicating telephone system with its attendant advantages. But the world is bigger than that; it has little use for the "Soviet Telephone." The universality of such a country-wide system as that developed by the Bell Telephone Company, declares Mr. Lambert, gives to the telephone its chief and immeasurable value. In modern civilization, there is no room for a hermit —no place for a man or a business without a telephone.

Problem of Modern Office Building.

In the development of the telephone industry, there have been many and intricate problems, and among them the one of providing adequate facilities for telephone service in the modern office building has been kaleidoscopic in its changing phases. It not only involves cabling the building itself, but when Aladdin's Genii suddenly erect a great office building in a district already crowded with telephone service, new conditions are created. Very often a new line of conduit must be laid in the streets, additional office switchboard equipment and distribution facilities provided, together with a great volume of interdependent details unknown to the public and too often little known and appreciated by those in the business not directly engaged in such studies. For the telephone company under normal conditions, to be prepared for a general increase in service, is a comparatively easy matter, but forecasting just where and when the next "skyscraping" office building will be erected is one affair, and forecasting correctly, far enough ahead to be able to provide underground facilities and central office equipment that shall be adequate, not wasteful, is quite another matter. Estimating future service demands is properly the function of the commercial department; and the whim of an owner or the collapse of one of his financial ventures may at any time make a previous study of telephone requirements incorrect, however carefully prepared.

Future Growth Must Be Cared For.

When a building has been planned and contracts let for its construction, the definite problem of cabling the building for telephone service is begun. Through the architects and owners, the telephone engineers undertake to obtain enough reliable information relative to the proposed building to warrant them in formulating a definite plan of supplying the building with the necessary telephone service. As before stated, this frequently includes, and must consider the question of additional underground cables and central office equipment together with the more specific problem of planning and installing cables and terminals in the building itself that shall meet the immediate demands, and anticipate the future requirements with the least amount of idle plant. Through long established custom, no one questions the equity and justice of a building owner paying for the installation of pipes that distribute gas and water throughout the building; and with the advent of electric light and power service, and the concomitant fire risk attendant upon poor installation, the owners willingly undertook to furnish the conduit, wires and equipment necessary for such service in the building. But when the telephone entered the business field, there was an apparent reversal of form.

Telephone Unlike Other Public Utilities.

The telephone companies generally undertook to furnish the entire telephone equipment including the wires and instruments placed in the patron's property. This, however, never contemplated the placing of any conduit, moulding or the like which became a part of the permanent building plant. In this connection, the telephone companies have

always reserved the right to remove whatever equipment they furnish, in cases of changes or discontinuation of service. This practice was the logical sequence of good telephone service which in some respects differed from that of other public utilities. The water, gas and electric light service is strictly an individual one insofar as any building is concerned. There is "no inter-relation" between buildings; not even between floors of the same building. The failure of the water pipes in one building has no effect whatever on the service in another except the negligible tendency to improve it by a slight increase in pressure. The same is true of gas and electric light, but with telephone service the uninterrupted intercommunication feature applied to a country-wide territory is its greatest single factor of value. Every telephone is on speaking terms with every other telephone.

Our Advantages Over European Practice.

With this fundamental in mind, together with a knowledge of the wretched service given in some of the European countries where subscribers keep their own instruments in repair, the Bell system undertook to control the entire plant, even at a sacrifice of earnings, in order to give better service. This practice originated at a time before the telephone had come to its own in the field of importance. In the evolution of the art, one telephone alone had no value—two became of scientific interest and held the potential power of one of the most important industries that go to make and maintain a higher order of civilization. Thus, the telephone growing in value to the public, in a geometrical ratio as their number increased has become so important and far reaching that the owner of a building should be, and naturally is, equally interested with the telephone company in providing means for supplying telephone service to his tenants. Without telephone service, his building is not rentable.

Telephone Engineers Cooperate With Architects.

This fact being understood by the owner of a prospective building, little difficulty is experienced in persuading him to provide suitable cable and wire paths, such as conduit, runways and mouldings in which the telephone company may place the necessary equipment for serving the building as it is evidently to his own advantage. Usually the field engineer for the telephone company at the request of the architect goes over the plans with him and indicates a suitable conduit system that will care for the estimated service, allowing a safe margin for growth and changes. The density of service expressable in the number of square feet of rentable floor area per pair of available conductors is an important fundamental, and being once determined from the information obtainable, becomes a basis for the detailed plans of cabling the building.

One of the Many Cabling Problems.

Apart from the underground service that will be required, a building cable plan includes a main terminal or distributing frame usually located in the basement and from which one or more riser feeders lead by way of wire shafts to the several floors where, by means of branch cables, further distribution is effected to the several floor boxes or terminals. The floor cables are usually distributed by means of conduit and wire moulding of sizes and types approved by the telephone company. The floor terminals are placed with the idea of minimizing the wire runs necessary for the installation of subscribers' instruments, and the distribution of conductor pairs to these several terminals is intended to provide both a flexible and an economic installation. The present practice of cabling office buildings for telephone service leans decidedly toward having a certain proportion of conductor pairs running directly from the various floor terminals to the main frame in the central office and not appearing at the basement terminal. This system would be ideal if the estimated requirements for these "direct feeders" could be made reasonably correct. In the present state of the art, it is reasonably certain that there will be at least one direct feeder necessary for each office, and for every one of such feeders that is used, there is a distinct economy of cost of installation, wnich also minimizes annoyance to both landlord and tenant. If, however, there should be mauy unused direct feeders and the building involved a long distance from the central office, then the question of idle plant becomes a factor for consideration. This phase of the cabling problem is an example of the many that must be considered in planning cable distribution in the larger office building.

What Is the Limit of Density?

It has been suggested that the upper limit of telephone density in any office building would be one pair of conductors, or one instrument per "desk"; approximately one pair per hundred square feet. Such a density seems hardly possible at the present state of the art, though we have in Chicago one building in the Board of Trade district that has one telephone to each 141 square feet. This condition is abnormal and cannot be accepted as standard for other buildings even though indicating a possibility in future development. The telephone engineer is concerned in providing adequate facilities for service with a minimum expense of installation and maintenance and so far as possible provide a system that shall anticipate future changes of tenancy and growth of service. In general, it is his business to blend technical experience with prophecy and make a success of it.

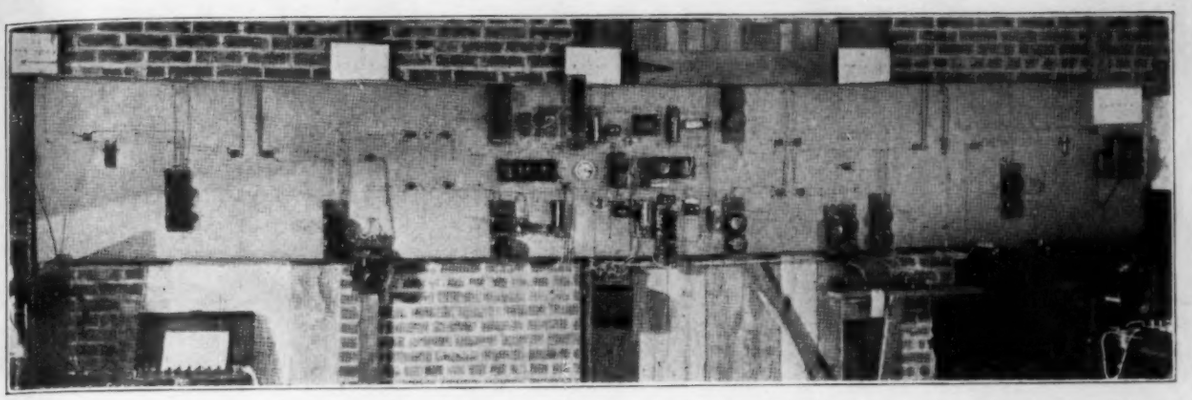
PUBLICITY IDEAS.

Telephone Men to Learn How to Use Advertising at Illinois Meeting.

Jacksonville, Ill.—A district meeting of the Illinois Independent Telephone association will be held here October 12 a. m. The keynote of the meeting will be "Publicity Methods In Connection With Rates, Service and the Sale of Securities". In connection with the meeting a Free Operators' School will be held, at which modern efficiency methods in telephone operating will be taught to the operators attending the meeting and employed in telephone systems in the western central part of the state.

Telephone companies in the district surrounding Jacksonville will be notified by direct mail but each and everyone is urged to send its representatives and as many operators as can be spared from the switchboard.

The State Convention of this association will be held at the Leland Hotel, Springfield, Ill., on November 8, 9 and 10. Both operating telephone interests and manufacturers are showing remarkable interest in the 1921 convention. The program will be arranged so that it will be profitable to all.



On This Board the Intricate Workings of Repeaters and Repeater Circuits Are Demonstrated and Explained to New York Telephone Company's "School Boys".

OKLAHOMA'S PHONES.

The State Boasts 240 Telephone Companies; Worth More Than 20 Million.

Oklahoma City, Okla.—O. D. Hall of the Oklahoma Public Utility Information Bureau, writing of the state's telephone development remarks:

"The first telephone line in Oklahoma was built in 1886, ten years after the discovery of the telephone. This line extended from Tahlequa, capital of the Cherokee Indian nation to Muskogee. Later the Missouri and Kansas Telephone company installed small exchanges at Oklahoma City and Guthrie and in 1897, toll lines were built out of Perry and Pawnee by the Arkansas Valley Telephone company.

"From this small beginning the telephone industry of Oklahoma has grown until it represents a total investment of $20,843,259, not including a number of small companies that have not reported this year to the corporation commission. Thousands of miles of wire owned by 240 companies stretch through city streets and connect small towns and rural subscribers with central exchanges.

"The telephone industry has been hard pressed to keep pace with the phenomenal growth of Oklahoma's cities. Figures, put out by the corporation commission in connection with recent telephone orders, show that from March 1, 1911 to December 31, 1920, new installations of telephone instruments at Oklahoma City increased 125.8 percent and at Tulsa 631 percent. The rapid growth of Oklahoma cities and towns makes necessary practically the rebuilding of telephone exchanges within the period of a few years.

REPEATER LESSONS.

New York Has Model Working Lines for Explaining Repeaters.

Kingston, N. Y.—Light on the hidden mysteries of repeaters and repeater circuits was given in Kingston's "Little Red School House for Telephone Men."

A model installation, compactly laid out, as shown by the accompanying illustration, was the central feature of the educational course. By means of this equipment, a thorough and understandable session on repeaters and repeater circuits was conducted.

It is planned to make use of this "vest pocket" telephone system in bringing the entire line before the students for simplifying and facilitating the lessons. The course given at Kingston covered elements of direct current, alternating current, telephone transmission, elemental theories of the repeater and repeater circuits, a thorough study of the routines affecting repeater stations, and various laboratory tests to demonstrate the theories taken up.

THANKS! BUT WE NEED MORE.

To those subscribers who responded to our call for back issues of March and April, 1921, TELEPHONE ENGINEER, we extend our thanks.

But still we are shy some copies of these back numbers to be used in filling requests. We need 14 more March issues and 2 more April issues. Your subscriptions will be extended two months for each copy sent. Can you help us and the people who are so anxious to get these missing back issues?

TELEPHONE ENGINEER
Editorial Offices; Steger Bldg.
CHICAGO, ILL.

70% NEW PLANT.

In Six Years Past Detroit Has Built Up Great Company—Spending Fast Now.

Detroit, Mich.—Approximately $2,500,000 has been expended by the Michigan State Telephone company on its exchange plant in the city of Detroit within the last year, according to officials of the company. This new work included the installation of central office equipment, the extension of cables and wires into all parts of the exchange area. Practically 70 per cent of the Detroit telephone plant is new, having been built in the last six years.

Detroit has one of the half dozen most modern telephone plants in the world, with its 16 central offices, widespread underground cable systems and wonderful operating and power equipment, officials say. The plant is practically storm proof.

Statistics from all over the country show that nowhere has there been such rapid telephone plant developments as in Detroit the past half dozen years. In 1910, Detroit, a city of 484,000 people, which included Highland Park and Hamtramck, had 47,500 telephones, or one for every ten persons.

Today, the same area, with approximately 1,116,000 people, has 150,000 telephones or one for every seven persons.

Telephone growth in ten years has been more than 200 per cent against a population growth of 130 per cent.

The new telephone plant, installed in an effort to meet the city's needs and desires, was the most modern obtainable and was put in during a period of the highest costs and greatest labor turnover the telephone industry has ever known, according to officials of the company. Resources of the company were strained to meet the community's needs, according to Judge Franz C. Kuhn, president.

Government Phone Book

Bureau of Standards Issues Circular 112---Volume Is an Exhaustive Treatise of American Telephone Practice in Good Shape for Practical Man and Student

Washington, D. C.—Circular No. 112 of the Bureau of Standards is a comprehensive treatment of the telephone industry's operating methods. Intricate technical details are avoided so the book as it now stands, a volume of more than 200 pages, is as good and broad an elementary text book as the average telephone man would want.

The volume is sold only by the Superintendent of Documents, Government Printing Office, Washington, D. C., and will be sent on receipt of 65 cents.

In announcing Circular No. 112, the Bureau of Standards says:

"The several manuscripts for this Circular were examined by a large number of persons skilled in the art, and most carefully revised as a result of the comments and criticisms received. Thus every effort has been made to present the subject in an authoritative manner.

"It is hoped that any errors in the present edition will be called to our attention before the next and probably larger edition is issued. Your helpful criticisms and suggestions are therefore requested.

The plan of the book as told by the Bureau is as follows:

"Service in general, service grades, and classification required to meet the needs of the users and service development as related to the telephone plant are considered in an introductory section.

"This is followed by four sections in which the telephone plant and its operation are described. The first of these comprises brief descriptions of the most important developments of the art arranged approximately in chronological order. The second is descriptive of manually operated equipment with due consideration of the many varieties in use. The third is descriptive of three basic systems of automatically operated equipment commonly known as the automatic system, the automanual system and the panel type, machine switching system. The fourth is descriptive of outside line wire plants by means of which telephone stations are connected with central offices and central offices with each other.

"The plant sections are followed by a traffic section in which the handling of calls from a quantitative standpoint is considered. This includes the determination of amount of plant facilities and number of operators required. quired.

"By means of the descriptions given in the preceding sections the reader is prepared for a discussion of service from an analytical standpoint. In the next section the elementary characteristics of telephone service which are peculiar to the nature of the service and to the manner in which it is rendered are explained in relation to grade of service.

"A section regarding public relations is included to cover commission regulation of telephone service and a conclusion regarding the subject of service standards. A statistical section is appended."

Scope and value of Circular No. 112 may be seen from the following table of contents:

I. Introduction
- 1. Telephone utility
- 2. Telephone service
- 3. Grade of service
- 4. Service classification
- 5. Telephone plants in general
- 6. Service development
- 7. Object and scope of this circular
- 8. Treatment of the subject
- 9. Acknowledgements

II. Developments of the telephone art
- 1. Bell's invention and demonstrations
- 2. Early applications
- 3. Early signaling devices
- 4. Early battery transmitter and the induction coil
- 5. Early telephone switchboards
- 6. Metallic circuits
- 7. Copper line wire
- 8. Bridging telephones
- 9. Transpositions
- 10. Selective ringing
- 11. Multiple switchboards
- 12. Outside line cables
- 13. Transmitter developments
- 14. Common-battery system
- 15. Phantom trunks
- 16. Loading coils
- 17. Automatic switching systems
- 18. Semiautomatic switching systems
- 19. Recent developments of the manual switching system
- 20. Repeating amplifiers
- 21. Simultaneous telephony and telegraphy
- 22. Radiotelephony
- 23. Multiplex telephony

III. Telephone plant—Equipment of manual switching systems
- 1. Local equipment
  - Telephone station equipment
    - Signalling equipment
    - Transmitter
    - Receiver
    - Protector
    - Inside wiring
    - Rural equipment
    - Extension equipment
    - Public telephone equipment
    - Private branch exchange equipment
  - Central office equipment
    - Line terminal and protector equipment
    - Switching equipment—commonly used
    - Switching equipment—newer types
- 2. Toll equipment
  - Ring-down trunks
  - *A–B* toll trunks
  - Tandem toll trunks
  - Recording trunks
  - Toll switching trunks
  - Recording operator's position equipment
  - Line operator's position equipment
  - Timing equipment

IV. Telephone plant—Equipment of automatic switching systems
- 1. Automatic system — Local equipment
  - Telephone station equipment
  - Equipment common to manual system
  - Automatic coin collectors
  - The dial
  - Private branch exchange equipment

Central office equipment
Automatic switching equipment
Manual and automatic switching equipment used in combination
Special equipment for handling calls between automatic office and manual-office stations
Equipment for calls from automatic to manual stations
Manual office equipment for calls to automatic stations

2. Automatic system — Toll equipment
Ring-down trunks
Recording trunks
Toll switching trunks
Recording operator's position equipment
Line operator's position equipment
Timing equipment

3. Automanual system
Equipment common to other systems
Automanual switching equipment

4. Panel-type machine switching system — Local equipment
Telephone station equipequipment
Equipment common to manual system
The dial
Private branch exchange equipment
Central office equipment
Machine switching equipment
Manual and machine switching equipment used in combination
Special equipment in manual offices for handling machine-station calls
Equipment for calls from machine stations
Equipment for calls to machine stations

5. Panel-type machine switching system — Special toll equipment
Outgoing-toll call equipment in machine offices
Incoming-toll call equipment in machine offices
Toll operators' equipment in toll central offices

V. Telephone plant—Outside line construction
1. Local line construction
Cable terminals
Underground cables
House cables
Block cables
Aerial cables
Pole lines
Station connections
Protectors
Water crossings
Rural lines
2. Toll line construction
General construction
Phantomed toll lines
Loaded toll lines
Toll lines loaded and phantomed
Toll lines with repeating amplifiers

VI. Telephone traffic
1. Traffic variations
2. Handling traffic
3. Traffic measurements
4. Determination of plant facilities required
5. Training operators
6. *A* operators' loads and position equipments
7. *B* operators' loads and position equipments
8. Distribution of load
9. Supervision and observation

VII. Principal elements of telephone service
1. Adequacy of service development
Adequacy of classes of service
Adequacy of plant facilities
adequacy of operators
2. Quality of speech transmission
Degree of loudness
Accuracy of reproduction
Naturalness and intelligibility
Uniformity
3. Dependability of speech transmission
Plant design
Plant construction and installation
Plant condition
4. Quality of operation
Speed
Accuracy
Secrecy
Uniformity
5. Dependability of operation
Reliability of switching equipment
Reliability of operating force
6. Degree of safety
7. Quality of relations with public
Courtesy
Property rights
Sightliness of plant
Assistance
Complaints and criticisms
Discrimination
Operating annoyances
8. Degree of public cooperation
Rights of way
Courtesy
Care of telephone
Use of telephone
Adequacy of incoming facilities
Reasonableness

VIII. Public relations
1. The need for regulation
2. The legality of public regulation
3. Federal regulation
4. State regulation in general
5. State regulation of telephone utilities
Certificates of public convenience and necessity
Service regulation
Plant extensions
Abandonment of service
Physical connection
Accounting
Valuation
Rates
Rate schedules
Contracts and collections
Discrimination
Standards of telephone service

Appendix.—Development of the telephone industry
1. General development
2. Number of telephones
3. Number of messages or talks
4. Number of systems or lines
5. Number of miles of wire
6. Number of central offices and private branch exchanges
7. 1917 Summary

Tecumseh, Mich., Busy On Underground Work.

Tecumseh, Mich. — Manager Pruyne of the local telephone company is supervising the installation of underground cable in the busy section of the city. Work of remodeling the building recently purchased for use as a central office also is being pushed.

Overhead System Being Over-Hauled at Rochelle, Ill.

Rochelle, Ill. — Installation of new poles and cable is a big part of the work now being done by the Rock River Telephone company here, in its improvement campaign.

"CLIP SHEET".

Illinois Bell Inaugurates A Press Service of Live Telephone News.

Chicago, Ill.—Volume one, Number one of the Telephone Press Service issued by the Illinois Bell Telephone company has appeared. This service, the size of a newspaper page, is being sent to all newspapers in the territory served by the Illinois Bell.

To become a "service" in fact as well as in name is the purpose of the clip sheet. Because of the universal interest in the telephone's romantic history, there is an intimate personal appeal to telephone news that hits every newspaper reader, according to the Press Service's announcement to newspaper editors.

The first issue is the newsiest, most practical utility news service the public utility field has put out, say newspaper men, and a bright and useful future is forecast for the enterprise.

John Spellman, head of the Illinois Bell's publicity staff, under whose supervision the service is prepared, is one of the ablest newspaper men in Chicago. He was connected with the Chicago Tribune prior to joining the Bell forces. With the Tribune he was automobile editor, and made the Tribune's automobile columns classics of their kind.

FREEPORT MEETING.

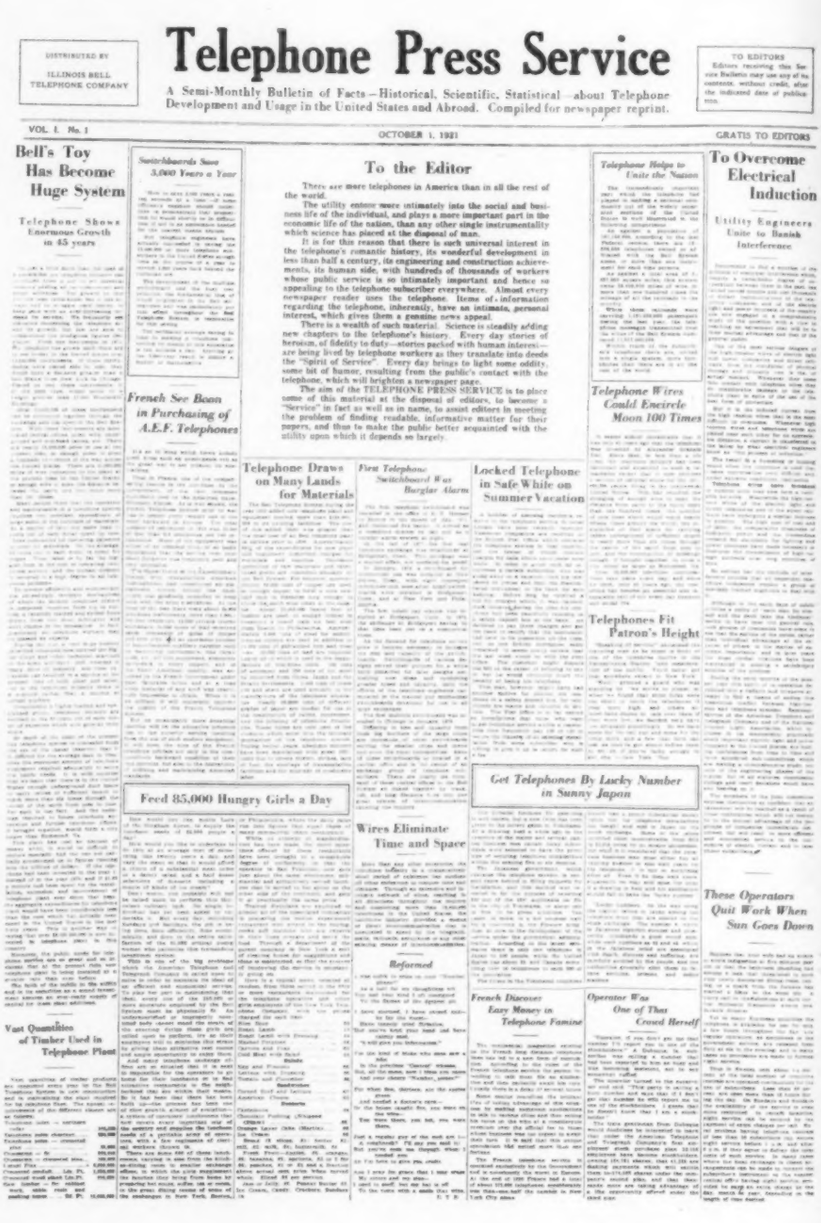
Illinois District Association Holds Lively Session September 29.

Freeport, Ill.—A very interesting and profitable district meeting was held here September 29, by members of the Illinois Telephone Association through the arrangement of Jay G. Mitchell, of Springfield, state secretary.

Louis Pitcher, of Dixon, presided as chairman, and Secretary Vivian, of the National Association, conducted one of his celebrated schools with great success. President Gordon, of the state association, made an instructive address on the necessity of Telephone Companies Establishing Proper Relations with the Public, suggesting local newspaper advertising, good service and courteous employes. One of the big hits of the occasion was the talk of E. R. Allen, of Savannah, Ill., who came to the telephone business from the railroad field but a year or two ago. He told how he had succeeded in Restoring Good Relations, which had been rather shaken before his regime. Incensed subscribers Mr. Allen cures by getting them to sit in the exchange and watch and listen to the operators' work. The subscriber thereby comes to appreciate the problems of the business and sympathize, rather than too readily condemn. While Mr. Allen has his residential subscribers pay through the office in person or by check, he individually, collects of the local business men at their establishments. This enables him to maintain intimate personal contact with the most influential factors of his community and he thus ascertains the things that are needed for improvement. The next district meeting is to be held at Jacksonville the latter part of October.

W. E. "Sitting Pretty" Chief Says—Sales About Same.

Charles G. DuBois, President of the Western Electric company, says: "The Western Electric Company reports sales for the eight months ending August 31st as approximately $122,000,000, or almost the same as for the similar period of 1920. Since the beginning of the year the company has reduced its floating debt by $7,500,000, and has increased its cash balance by $6,000,000, an improvement of $13,500,000 in its financial position."



DISTRIBUTED BY ILLINOIS BELL TELEPHONE COMPANY

Telephone Press Service

A Semi-Monthly Bulletin of Facts—Historical, Scientific, Statistical—about Telephone Development and Usage in the United States and Abroad. Compiled for newspaper reprint.

TO EDITORS: Editors receiving this Service Bulletin may use any of its contents, without credit, after the indicated date of publication.

VOL. 1. No. 1 — OCTOBER 1, 1921 — GRATIS TO EDITORS

Bell's Toy Has Become Huge System

Telephone Shows Enormous Growth in 45 years

Switchboards Save 3,000 Years a Year

French See Boon in Purchasing of A.E.F. Telephones

To the Editor

There are more telephones in America than in all the rest of the world.

The utility enters more intimately into the social and business life of the individual, and plays a more important part in the economic life of the nation, than any other single instrumentality which science has placed at the disposal of man.

It is for this reason that there is such universal interest in the telephone's romantic history, its wonderful development in less than half a century, its engineering and construction achievements, its human side, with hundreds of thousands of workers whose public service is so intimately important and hence so appealing to the telephone subscriber everywhere. Almost every newspaper reader uses the telephone. Items of information regarding the telephone, inherently, have an intimate, personal interest, which gives them a genuine news appeal.

There is a wealth of such material. Science is steadily adding new chapters to the telephone's history. Every day stories of heroism, of fidelity to duty—stories packed with human interest—are being lived by telephone workers as they translate into deeds the "Spirit of Service." Every day brings to light some oddity, some bit of humor, resulting from the public's contact with the telephone, which will brighten a newspaper page.

The aim of the TELEPHONE PRESS SERVICE is to place some of this material at the disposal of editors, to become a "Service" in fact as well as in name, to assist editors in meeting the problem of finding readable, informative matter for their papers, and thus to make the public better acquainted with the utility upon which it depends so largely.

Telephone Helps to Unite the Nation

Telephone Wires Could Encircle Moon 100 Times

To Overcome Electrical Induction

Utility Engineers Unite to Banish Interference

Telephone Draws on Many Lands for Materials

Thief Telephone Switchboard Was Burglar Alarm

Locked Telephone in Safe While on Summer Vacation

Telephones Fit Patron's Height

Get Telephones By Lucky Number in Sunny Japan

Feed 85,000 Hungry Girls a Day

Wires Eliminate Time and Space

Reformed

These Operators Quit Work When Sun Goes Down

Vast Quantities of Timber Used in Telephone Plant

French Discover Easy Money in Telephone Famine

Operator Was One of Thus Crowd Herself

FAVORS MELLON TAX.

Independent Association Tells Members Secretary's Idea Best for the Industry.

Washington, D. C.—Plan of secretary of the treasury Mellon for amending the income tax laws is preferred to the ideas of the House, by the United States Independent Telephone association.

The Association writes its member companies as follows:

"As is undoubtedly known to all of our members, Congress has under consideration amendments to the income tax laws.

"The House bill makes a number of amendments in the present law, but the one which is of interest to all telephone corporations is the proposal to increase the corporation income tax from 10% of all amounts in excess of $2,000, to 12½% of all such amounts. The Administration, through Secretary of the Treasury Mellon, has expressed the opinion that the corporation income tax should be fixed at 15% of all amounts in excess of $2,000 and to offset this large increase the Capital Stock tax should be repealed; thus simplifying the collection of taxes from corporations.

"Under the House bill the income tax paid by all companies will be increased 25%. Under Secretary Mellon's plan of offsetting the increase in the rate of the tax from 10% to 15% by repealing the Capital Stock tax, companies valued at $50,000 and under, if earning 6% on that investment, either will not have their income tax increased or will be called upon to pay less tax than under the present law. Companies valued at over $50,000 will in some instances have to pay more tax than for 1920 and in some instances less. Generally speaking, the Mellon plan will be of benefit to our companies—and in my opinion should have the Association's support. The House bill will work a hardship on all of our companies and in my opinion should be objected to by all of our members.

"No particular explanation need be gone into with you to point out the difficulties that regulated utilities experience in presenting claims to regulatory bodies for increased rates due to increased taxes. As is well known, a number of commissions have refused to allow telephone companies to include Federal income taxes in their operating expenses and therefore such commissions refuse to consider arguments advanced by telephone companies that consideration should be given the fact that they are required to pay increased Federal income taxes. Arguments have been made to both members of the House and Senate that utility corporations such as telephone companies, electric light companies, etc., should be exempt from further increase in income taxes. While we all realize that the Government must raise large sums of taxes, yet I think there is nothing unpatriotic in the telephone companies, upon whose service the public depends, urging no further increase in taxes, if such further increases will hamper the telephone companies in their financial operations and result in inadequate service to the public."

To Demand Business Interchange Under Pittsburgh Merger.

Pittsburgh, Pa.—Western Pennsylvania Independent Telephone companies plans to make a strenuous demand of the Pennsylvania commission for an order perpetuating an interchange of business to all points in Allegheny county and beyond under the Bell-Allegheny merger in this city.

ENGINEERS

Men with college training in engineering or the physical sciences, may obtain permanent positions in our Central Office Engineering Division. Practical telephone experience may take the place of college training.

Give full information in first letter as to age, education and experience.

WESTERN ELECTRIC CO., INC.
48th Ave., and 24th St.
CHICAGO, ILL.

ADDRESSES WANTED

Addresses of E. E. Traston, inventor of a loud speaking telephone, and Russell E. Traylor, inventor of an alternating current motor, are wanted by a foreign government whose representative has written TELEPHONE ENGINEER.

TELEPHONE ENGINEER
Editorial Offices
Steger Bldg., CHICAGO

Chicago Wireless Phones to Furnish Fire Alarms.

Chicago, Ill.—Chicago's police wireless telephone system is to be extended to supply fire alarm service. A 300 mile city zone is to be covered.

Troy, N. Y., Gets Only One Bid for Police and Fire.

Troy, N. Y.—Requests for bids on the installation of a private branch telephone exchange with six trunk lines, 26 extension services, and exclusive use of 46, and three miles of telephone line in this city got only one response. This bid was that of the New York Telephone company. Figures called for a flat monthly charge of $175.50.

Aldous Goes to St. Paul for American Steel and Wire.

Chicago, Ill.—American Steel & Wire company has appointed E. E. Aldous its representative in St. Paul–Minneapolis–Duluth territory, with headquarters at St. Paul. Mr. Aldous has been connected with the company for twenty years in different positions and, therefore, is well posted in its different lines and eminently qualified as a representative.

Direct Line Fort Worth—El Paso Considered.

Fort Worth, Tex.—West Texas Chamber of Commerce officials are renewing efforts to secure direct long distant telephone connections between Fort Worth and El Paso via the lines of the Texas and Pacific railway. Lines west from Fort Worth now stop at Odessa, and the lines east from El Paso end at Sierra Blanca.

Mountain States Plans $400,000 Budget for Southern Idaho.

Boise, Idaho.—Officials of the Mountain States Telephone and Telegraph company have approved an expenditure of $400,000 for construction work in southern Idaho during the coming year.

Italy to Spend 166 Million Lire on Wire Systems.

Rome, Italy.—Laws providing for an expenditure of 166,000,000 lire for the improvement of the telephone and telegraph system of Italy have been printed by the Italian official journal.

Glen Company of New York Makes Big Increase.

Little Falls, N. Y.—Capital stock of the Glen Telephone company, operating principally in Fulton and Montgomery counties, is to be increased from $400,000 to $750,000.

Gets "Safety First" at Last

Telephone Man Tells National Safety Council How An Accident Prevention and First Aid Campaign Earns Its Reward By Persistent and Intelligent Work With Workers

By F. M. Downey
New York Telephone Company

Your Program Committee originally requested the preparation of a paper on the hazards of the telephone business. As we telephone people did not agree with the Committee that there are any more hazards in our business than there are in any other walk of life, it was felt that the subject would be so limited that it might prove dry and uninteresting. It was, therefore, suggested to the Chairman that instead we choose as our subject today "The development of Accident Prevention and First Aid Work in the telephone field."

Before we take up these subjects it would seem to be in order to emphasize the statement justmade that in our business, as it is today, there are no particular hazards. It is true there is and always will be certain contributory causes leading up to accidents, but these causes should, we believe, in no sense be called hazards. Telephone plant in poor condition or not constructed in strict accordance with specifications, poles which require replacement and the presence of non-standard construction on jointly used poles, may be listed as known causes of accidents.

Line Work Not Extra Hazardous

There is a feeling existing among those outside of our business that line work is particularly hazardous. This theory has been exploded for all time for we have no greater number of accidents among this class of labor than any other. In fact in 1920 in the line force in the Division of the Bell Telephone company whose work has been selected for today's discussion the number of accidents was far below that of any other class.

Long before any systematic country-wide effort was undertaken to reduce accidents the telephone operating companies realized its importance although it was not referred to as an accident prevention campaign, work was undertaken which eventually resulted in furnishing the organization with a reasonably safe place to work.

When the accident prevention movement was in its infancy, that is when it was first exploited in our field, the employees at large did not take it seriously and it was more or less ridiculed. It was the prevailing opinion at that time that an accident was pre-ordained or arranged by fate and nothing could prevent it. I will attempt to point out the conditions as they were at that time and what has been accomplished to date.

About 8 years ago in spite of the fact that we had done a great deal towards preventing accidents, we continued to have what we considered an abnormal number of lost time cases.

When one reviewed the statements of accidents sustained by employees at the operating companies of the Bell System the natural question was "Cannot something be done to materially reduce these wholesale casualities?" Ours was a particularly difficult problem because we had been unable to discover a case which was in any way related to our work. The point which I wish to convey here is that none of the associated companies of the Bell System, so far as we could learn, had undertaken any constructive work along these lines and we were unable, therefore, to obtain the benefit of studies or experiences. It was consequently necessary for us to work out our own salvation.

While we had minimized to a great extent the danger of accidents to employees working on poles occupied jointly by electric light and power companies and the telephone companies by placing approved construction, we felt perhaps we had not done all we should to reduce the number of accidents occurring due to carelessness or thoughtlessness on the part of the workmen. The probable reason why nothing of value had up to that time been advanced to reduce accidents due to these reasons, was because it was an open question as to just what point to start from and along what lines to proceed to obtain satisfactory results. In an effort to do some real good, particularly in connection with fatal or serious accidents to employers, we made a general study of the situation and realized that our problem was largely an educational one. A set of stereoptican slides was then developed showing the cause of a number of fatal accidents which had occurred in telephone work. This was done with the idea that it would impress upon the workmen that in their calling too much care could not be exercised in their daily work and that in the particular cases illustrated, had the unfortunate victims taken ordinary precautions, they would in all probability be enjoying life today. At the meetings in which these pictures were thrown on the screen and which were well attended by the working forces, the subject of accidents as a whole was touched upon in a general way.

In our efforts at that time to reduce fatal and serious accidents, we warned the forces, charged them to be cautious, to wear rubber gloves and to use safety devices when the occasion should demand. We standardized our construction where we occupied poles jointly with electric light and power companies, furnished tools of a high standard, instituted periodical inspection of plant and tools, and in many other ways endeavored to bring about ideal conditions to reduce as far as possible the liability to injury. It was then necessary to have the co-operation of the workmen themselves to complete the job. The field that remained then for our endeavors was the one in which lay the serious and semi-serious accidents, falling between the classes of fatal and minor accidents. These are the type of accidents which cripple and incapacitate employees for weeks and months, perhaps for life.

Eliminating Accidents Factors

We know that if we could entirely eliminate the different elements or factors by which accidents are introduced, accidents would then cease and further efforts on our part to

minimize or eliminate them wholly or partially would be unnecessary. It is not meant, of course, that we ever expect to reach the stage where there will be no accidents. As long as the human machine continues to function just so long shall we have our share of accidents. What is meant, is, that with a reasonably careful working organization and a co-ordinated and enthusiastic supervisory force operation in unison, accidents can and will be reduced to a very small number. This will be proven a little later.

We next gave consideration to the thought that perhaps we were not doing all we might in an effort to decrease the number of serious and semi-serious accidents which were occurring daily. We, therefore, mapped out an intensive campaign and organized Accident Prevention Committees. These Committees worked out a definite plan to carry out the program. Suitable forms were prepared and distributed widely to the working forces asking their co-operation in reporting hazardous conditions. The proposition took real effect and we succeeded in clearing up a good many hazards in the plant. By acknowledging receipt of the recommendations from the field workers and later advising them of the disposition of their suggestions, we were able to aid many enthusiasts to the movement. This was unquestionably a first class asset, because it was a real step towards gaining the support and confidence of the forces. A review of a number of accidents which occurred at that time seemed to indicate that with a little thought and precaution on the part of the workmen or the foreman in charge of the job, several of the cases might have been anticipated and therefore avoided. We next gave attention to this phase of the work.

Start Slow.

The history of our efforts to solve the problem will, I am sure, prove interesting. During the first two years of our campaign we were naturally progressing through a series of experiments and no attempt was made to compile elaborate records. However, we observed that, despite the fact that the men had been given an unusually safe place to work, had been supplied with a great many safety devices and instructions, we continued to have accidents,—not particularly serious, but in sufficient number to make it essential for us to take steps to reduce them.

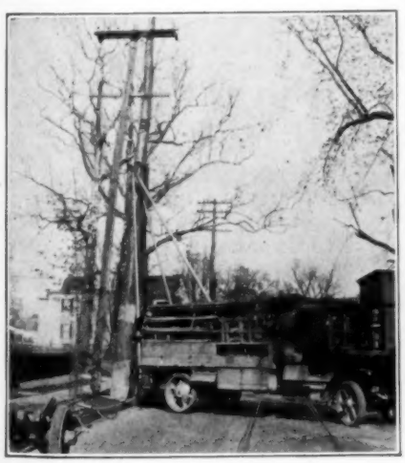
To start the year 1915 we determined to maintain a statistical record of accidents with a view to reaching a conclusion as to the best methods to pursue to reduce the losses. By persistent application of the practices already suggested, we attained a figure of 7.4 lost time accidents per 100 employees for the year. When we analyzed this mark we felt it was too high in comparison to the efforts we had put forth, and we resolved to better it in 1916.

We started well but the finish was even worse than the preceding year; the final result being 9.4 lost time accidents per 100 employees.

Due to the war activities forcing a curtailment of our program and the employment of much new and inexperienced help, the year 1917 was a particularly unfortunate one for us. From a figure of 7.4 accidents with loss of time per 100 employees in 1915, and 9.4 in 1916, we rose in 1917 to 11.3 accidents with lost time per 100 employees. We are all familiar with the conditions existing during 1917 and up to the signing of the armistice in the latter part of 1918. The labor turnover in our organization was very high and many of our people who had been specially trained in our work were entering the military and naval service. We lost a great deal of ground and conditions following the armistice went from bad to worse with the result that our figure for accidents with disability for the year 1918 reached the hitherto unbelievable mark of 13.0 injured employes for every 100 people employed. This had gone far enough and the time for action had arrived.

"Last Ditch" Drive

To start the year 1919, the problem was studied with as great care as was possible and we decided upon a campaign more intensive than any heretofore launched. We first set out to arouse the fullest interest and enthusiasm of all the force (including the supervising people, for without a supervising force working in harmony we found our efforts



On the left—A pole derrick is replacing a 40-foot joint pole. The New York Telephone Company says this derrick is the greatest money saver of all aerial construction devices, and next to the motor truck, the most popular piece of construction equipment. Center—A pole derrick removing butt. Under ordinary soil conditions butts can be easily removed with derrick. The center leg is extended on a steel plate base and butt is pulled with winch line. When conditions are not so favorable jacks are used under the rear corners of the truck to relieve springs. The butt is then started with jacks and pulled out by derrick. In the majority of cases it will be found much cheaper to extract the butt with derrick rather than pole jacks. At the right—A chauffeur and two men can load this trailer with fifteen 35-foot B poles in from three-quarters to one and one-half hours, depending on the location of the poles.

—Courtesy Telephone Review.

would not be successful.) We further saw the necessity of acquiring the confidence of the forces and to stamp out any antagonism and unjustified criticism which had been directed toward our efforts. The several safety committees were called together and the need of concerted action explained. The forces rallied, aroused to the sense of their responsibility for their own welfare. Strange to relate, despite what we had done, we were in the first month of 1919 worse off than ever, and the outlook for the future was very dark. We were, it seemed, squarely at a standstill,—we might say, retrogressing. A review of the situation together with careful studies that were made indicated that a large percentage of the accidents we were having were due either to carelessness or thoughtlessness of the person injured or his fellow employees. It was apparent that the most fertile field for us to bring about a reduction in the number of accidents was in the education of our people to be thoughtful and careful of their own safety and the safety of their fellow employees on the job. Well, to use the language of the day, we "got on the job" at once and the result was in a force of about 1800 men the particular division did not have a lost time accident for 65 consecutive days. Our "run" was broken on the 66th day by a comparatively slight injury, a sprained ankle, sustained by a foreman. We believe in our accident prevention work that if an employee's injury is slight, and he cannot perform his regular job, he can be used elsewhere.

The idea which we wish to transmit is that in the case of the foreman, he can as a rule in case of a slight injury which may prevent his working on the job, direct his forces from the office or do other constructive work. In the case of a lineman or an installer there is usually work in the storeroom or shop on which he can be used to advantage, provided of course the employee is physically able.

We sent a man around to this particular foreman's home with the idea of getting the story of the accident and if advisable bring the man to the office. His heart was in the right place and he did not want to be the one to break the "run" and was willing to come back on the job. Just as he and the men who had been sent for him were going out of the house, his wife appeared and despite their pleadings, she refused to let him return to work, and he didn't. So our 65 day record had been broken and a woman helped to do it. This unfortunate incident did not discourage us. On the contrary, it was if anything, probably a good thing for our accident prevention movement. We started again and for the year succeeded in reducing our lost time accidents per 100 employees to 3.7 compared with 13. per 100 employees for the previous year. The campaign of education which was undertaken has been continued and by constantly keeping before our people the necessity of being careful, our problem has become simplified. The best performance to date in our Division was recorded in 1920 when a figure of 2.8 lost time accidents per 100 employees was established. This compares with a rating of 6.3 per 100 employees for the entire Company.

The outlook for the present year is excellent and we are at this time in the Division referred to, running slightly under our 1920 figure.

Feeling the need of a knowledge of what to do in case of injuries sustained on the job, we tried out in the fall of 1920 in the Division just mentioned, an experiment in training groups of our people in first aid to the injured. We believe that first aid is first and foremost a cure and while separate and distinct from Accidental Prevention, it is unquestionably of great value and will certainly aid us in our efforts to reduce the disability following accidents.

First Aid Interests

About the middle of last November we sent to each employee who was eligible to take the training a circular outlining the course to be given on the employee's own time. We had tentatively set a mark of 100 as the possible number who would avail themselves of the opportunity. To our surprise nearly 600 employees, or approximately 40% of the Plant Force eligible for the first aid training responded to the invitation.

Beginning early in January 1921, 45 employees representing the various sections of the Division were selected from the total registrants to take an instructor's course under a physician who was authorized by the American Red Cross Association to carry on the work. Instructions were given three nights each week at Division Headquarters. In exactly 23 calendar days the courses were completed, and an examination was then conducted under Red Cross auspices. Every one of the employees (except one man who was prevented by illness from completing the work) passed the test with very credible marks. The Red Cross authorities considered this an excellent showing and awarded each person a Red Cross certificate for proficiency in First Aid work, and an authorization to carry on the work as lay instructor. After the instructors had completed their tuition, the remaining employees who had registered for the training were divided into classes according to locations where they were employed, and the instructors at these points were assigned classes. The field classes started the first week in February and were completed early in March. The Red Cross organization then conducted examinations and of the 287 people who responded for the examinations, every one passed with a very satisfactory mark, and were awarded certificates. After the examinations, five-men teams to the number of 36 (or 180 odd people) representing the various sections and working forces of the division were formed and intensive training begun under the direct supervision of the first-named instructors. The idea back of the team work was to have the largest possible number of men participate in the first aid team practice as often as opportunity afforded, the practices being held in the evenings on the employees' time and at convenient locations.

After approximately two months of team training, elimination contests were staged at the several Central locations in the Division to determine the best teams in the respective sections. The winners of these elimination contests were then brought together for semi-final contests to determine the twelve best teams in the Division, the survivors of the semi-final contests to participate in the final competition for the Division championship, trophy and medals. At the final affair held early in May of this year, the interest and enthusiasm ran so high that we were obliged, mind you, in our initial first aid campaign to procure the Armory, the largest building in the headquarter city of the Division, in order that we might handle the number of people who indicated their desire to view the result of the training. On the evening of the contest, the Armory was taxed to its capacity, over 4,000 people witnessing the competition.

Our progress in First Aid training has been the subject of favorable comment by authorities and by some

was considered a record. In fact we were told by experienced people at the time the proposition was undertaken that the work was particularly trying and that we could not put it over under twelve months. But we knew our people and with the right groundwork laid and the entire problem planned to the finest detail we accomplished in four months what had, heretofore, been considered impossible.

It is not possible, nor is it desirable to express in definite terms to what extent the employees, the public and the Company have mutually benefited as a result of the first aid training. We are not at all certain that it will cut down the number of accidents, but we hope it will. We are reasonably certain, and we speak from the experience of other industrial concerns who have adopted first aid training, that we can reduce the seriousness of accidents as measured by the number of days lost time due to the accidents. In one of the operating companies of the Bell System with whose work along accident prevention and first aid lines we are familiar, there has been shown a steady and marked decrease in the number and seriousness of the accidents.

There are several cases on record where our people have rendered assistance to the public and in one specific instance a life was saved after it had been despaired of by bystanders who were not familiar with first aid and its value.

Vital to Progress.

We have learned by experience that there are several factors which are necessary to continue progress in accident prevention and first aid work.

First—It is a vital necessity to have the wholehearted and cordial co-operation, support and interest of the forces, both the supervisory and working classes, and all who have any bearing on the work. The forces and committees must work with faith for unless the foundation of belief is prevalent the road will be rocky and the results scanty.

Second—Competitive first aid demonstrations are invaluable because they serve to maintain the enthusiasm already manifested. When properly planned and advertised the first aid team contests bring out the crowds and a great many lukewarm employees are convinced and added to the movement.

Third—The publishing and distribution of periodical bulletins showing the cause and result of accidents and the remedy is excellent accident prevention propaganda. These need not be lengthy or elaborate. Brief, concise and illustrated where necessary.

Fourth—The publishing of monthly scores showing the number of accidents per employee, or per 100 employees by forces is another form of maintaining the good effects already gained. This latter scheme introduces a sporting feature into the work and we find it is productive of good results for no supervisor wants to be in the limelight in this connection.

Fifth—The development of committees whose duties comprise the reviewing of reports of accidents when they occur, preparation of educational data for the working forces, reviewing of practices and circumstances which might be productive of accidents and general supervision of the work. These committees are very important links in the organization and are the clearing houses for the movement.

The future results in the development of accident prevention and first aid in the telephone field rest to a great extent on what we shall be able to do based on our previous experience.

There is one thing certain, i. e., an increased loyalty and efficiency that is difficult to measure has been obtained through our accident prevention and first aid progress. It has served to develop and broaden the forces, it has brought about through personal contact a spirit of loyalty and co-operation which is so vitally important. We have high hopes for the future and we look for a more thoughtful and careful working force and a much improved job all the way.

In connection with our first aid work, there is a factor which is outstanding because of its unusual nature. When we planned the campaign it was specifically made clear to the employees that all of the training would be voluntary and would be on their own time. Through all sorts of winter weather, through all manner of handicaps (travelling long distances, eating cold meals or perhaps none at all) the forces stuck to the job, with the result that although only 332 of the original registrants took the final examination, practically every one of the 600 employees who participated in the work possess a knowledge of what to do and how to do it should the occasion demand.

Therefore, in closing let us not forget these men, nor the girls who also participated in the work, for after all is said and done, the results could not have been achieved had it not been for their unswerving devotion to the cause, their loyalty to the promoters of the project and their intense desire to create and maintain a standard of sportsmanship in First Aid work which will be difficult to excel for those who follow.

KINLOCH'S VALUE.

Commission Engineer Sets Mark $5,268,345—Company's Own Figure Higher.

Jefferson City, Mo.—According to the finding of chief engineer Harrop the value of the property of the Kinloch Telephone company of St. Louis is $5,268,345, including property owned and leased by the company, but exclusive of long distance lines and Kinloch property outside the St. Louis exchange.

Figures filed by Harrop fix the actual value of the physical property at $4,077,361. The main office and land, occupied by the Kinloch company at Tenth and Locust streets, which is leased from the Kinloch Building Co., was valued by Harrop at $783,824. The switchboard in the main office, leased from the Kinloch Long Distance Telephone Co., was valued by Harrop at $407,160.

Harrop listed separately the physical property actually owned and that leased to enable the commission to consider leased property on a different basis, if it so desired, in any rate case in which the valuation may be used.

Harrop's figures are considerably lower than the valuation figures of the company's engineers, owing to a different system of valuation. The company's engineers did not figure the valuation on actual cost of the property, but filed two valuations, one arrived at by figuring reproduction value of the plant at the average of costs for the years 1914 to 1919, inclusive, and another fixing reproduction value on the basis of costs in 1920.

The company's engineers figured reproduction value on average costs from 1914 to 1919 at $7,189,452, exclusive of going value or intangibles. which they figured at $1,293,000. Reproduction value on a basis of 1920 costs, exclusive of going values, was fixed by the company's engineers at $10,098,408. The Public Service Commission engineers included no intangibles in their appraisals.

Connection Fee a Just One

Telephone Company is Protected Against Thoughtless and Unscrupulous Subscribers by Service Connection Charge---Grand Rapids Improves on the Idea

By W. S. Vivian

In the event of a monthly collection system the rule is that all rentals must be paid on or before the 15th of the month. If a quarterly collection system is in use, the rule is that rental bills must be paid on or before the 15th of the first month of the quarter.

In the event of failure on subscriber's part to pay the bill, he receives a form letter stating that if not paid on or before a given date, his service will be discontinued. If the subscriber then fails to pay, he receives a further form letter that if not paid on or before a given date, the telephine will be removed from his premises. If the subscriber then fails to pay, the order goes through to the proper department to remove the telephone. Men are then dispatched and when they appear, Mr. Subscriber many times has given them the laugh and remarks with a smile, "Well, I don't want my telephone removed, so I will pay the bill." In the old days, all the telephone company could do was to smile, thank them, and accept the money, and give them proper receipt. The fact that several dollars of extra expense had been incurred meant nothing to the subscriber.

As a result, many thousands of dollars of expense were annually paid by the telephone company, which should have been paid by the subscriber. During the war, while the wire companies were under the control of the Federal Government, a certain order was issued calling for a $3.50 service connection charge. Most of the operating companies realized that the service connection charge was a fair charge, one which the subscriber should properly pay, but possibly not so many realized what a protection that service connection charge would be to the telephone company. Since that time, however, when Mr. Subscriber neglects to pay his rentals on time, and as a result his telephone is ordered out, he realizes that if the telephone is once taken out, it will cost him $3.50 to get his service re-established, all of which means that subscribers are not allowing these matters to go by default unless they really expect to give up the telephone and such cases are comparatively few. Not only has this service connection charge proved to be a great protection in the way of being imposed on by subscribers, but it has proved to be a source of income. In one city of 150,000 population, it amounted to approximately $12,000.00 last year.

Improves on Idea.

General Manager C. E. Tarte, of the Citizens Telephone company of Grand Rapids, Michigan, has gone the Service Connection Charge one better. In an order adjusting rates recently, the Michigan Public Service commission included a clause authorizing the telephone company to make a charge of $3.00 to cover the expense of going out to remove the telephone in the event the subscriber should want the telephone retained on his premises.

Now, when Mr. Telephone Company Representative calls, and the subscriber greets him with a smile and the information that he will pay the telephone bill as he does not want the telephone removed, Mr. Telephone Company Representative says, "We are very sorry, Mr. Subscriber, but it will cost you $3.00 now, to keep the telephone, in addition to the charges," and then Mr. Subscriber says, "Well, I won't pay that, you can just take it out, and I will order it in tomorrow." Then Mr. Telephone Company representative says, "But, if we take it out and you order it in tomorrow, then you have not only got your regular rental charges to pay, but in addition, you will have to pay $3.50. Hadn't you better leave it in and save 50c by so doing?" And of course Mr. Subscriber agrees. This is a fair charge which commissions everywhere should approve.

Service connection charges are a good thing from the Telephone Company's viewpoint; they are fair and equitable, and there should be no hesitancy on the part of any company anywhere, against enforcing them to the letter.

WITHIN THE ATOM.
John Mills' New Book Tells of Mysteries Science is Penetrating.

New York City.—Formerly considered an indivisible particle of matter, the atom, now is yielding to scientific research that promises to reveal many astonishing facts. John Mills, in his new book, "Within the Atom" presents the outline of this investigative campaign in a manner which rivals the "six best sellers" in its interest to the reader with a technical bent.

Einstein's theory is simply a beginner in this drive to get to the bottom of the universal scheme of things, we read in Mills' volume. The telephone man, considered somewhat of an authority on scientific matters can use the Mills book as a priming coat of culture for the long winter evenings when his high browed friends drop in to seek the "close up" on electrons, protons, and such.

The price is $2. D. Van Nostrand company is the publisher.

Crosby, Minn. Extending Its Rural Range.

Crosby, Minn.—Local interests report speedy progress in extending telephone lines to include the rural communities in Crosby territory.

De Luxe Edition of Telephone Pioneers Meet Issued.

New York City.—Proceedings of the seventh general convention of the Telephone Pioneers of America, held in Montreal, have appeared in de luxe form and now are being distributed to the members.

Kentucky Company Increases Capital Stock.

Lebanon, Ky.—The Lebanon Home Telephone company has amended its articles of incorporation to allow a capital stock increase from $7,500 to $30,000, and to limit the indebtedness to the full amount of its capital stock.

Selling A Toll Campaign

Southern Bell Merchandises Its Toll Campaign to its Employees First—Gets Them "Lined Up" for Big Drive on Utilization of the L. D. Lines

Atlanta, Ga.—Southern Bell Companies are conducting a toll business development campaign that is a model of its kind for thoroughness and enthusiasm. Each factor in the organization is being sold the campaign first, and with the internal details of the drive for business satisfactorily settled, the subscribers in southern territory are getting a taste of the keenest solicitation for toll business they ever experienced.

Indication of the way in which the campaign is being stirred up among the Southern Bell employees is given in the following story from that company's excellent house organ, the Southern Bell News. The News says:

Toll service can be sold. This has been sufficiently demonstrated by investigations and experiments which have been carried on for the past several months by the commercial forces. This is a matter of such great importance to the company and to the territory which we serve that it is only proper the pages of the News be used to spread information regarding the sale of toll service. In this way the benefits will be more quickly and fully realized.

For several years the amount of business offered was greater than our facilities and operating forces were able satisfactorily to handle. Therefore, it was not deemed wise then to develop the toll business.

Ready for New Business.

However, a decided change took place the latter part of last year, and we are now in position not only to take on more toll business, but to handle it better than ever in our history. Also, the financial situation of the company requires that all of us put forth every effort to increase the volume of business and the revenues from that business. Further, it is believed that our efforts to increase the volume of toll business, in proper manner, will contribute largely to the improvement of general business conditions within this territory. It follows that where our efforts may be productive of so much good to both the company and to those we desire to serve, such a program will invite the fullest interest and develop enthusiasm in each of us to add our part to the benefits sought.

The sale of toll service involves each and every employe of the company directly or indirectly in that they render or contribute to the rendering of toll service which the commercial people sell.

Before toll service can be sold that service must be satisfactory to the user and adapted to his needs. The service must be as nearly continuous as it is reasonably possible to make it, and the lines and equipments must afford a satisfactory grade of transmission. The circuits should be adequate in number to care for the volume of business offered, and the operating of the lines should be such as to give as nearly as possible uniformly quick service over all the lines. These things being done, the patron can obtain connection with the desired distant point and carry on conversations easily every hour of any day. It is not sufficient that the patron can talk some days and not others, and that some calls go through in five minutes and others go through in an hour.

WHAT WE WANT TO TEACH THE PUBLIC

Tell it by long distance telephone,
Ask it by long distance telephone,
Sell it by long distance telephone,
Buy it by long distance telephone,
Develop relationships by long distance telephone;
Lessen your costs by long distance telephone;
Expedite your business by long distance telephone.

—Southern Telephone News.

Dependable and regular service will build up in the minds of the public a confidence in our service and, finally, a dependence upon our toll service for business and social matters which can be attained in no other way than through dependable and regular service.

Such toll service can be sold by the commercial people. We are glad to say that today's service has reached that speed of operating and a regularity approaching uniformity that has not been attained by us heretofore.

Toll service objectives set by traffic, plant and engineering forces, to be attained in the near future, can but result in still better service which in turn will invite further use by the people we serve, within and without the territory.

The Field is Clear.

When these investigations and experiments in the sale of toll service were begun, doubt was expressed as to the results because of general business conditions. These doubts have been effectively removed.

The volume of toll business depends upon the number of people served and upon the number of exchange stations by which they are served. Today there are more people in this territory than there were several years ago; there are more stations than there were last year. We have more and better circuits and we have better trained operators. There are many reasons why more toll business can be done.

After all, we are not concerned whether the volume of general business done today is greater or less than the volume done last year, but how can the business that is being conducted today be assisted and expedited by the use of our toll service. We have come to the definite conclusion that business generally can be conducted at a lesser cost or that business can be increased at a small additional cost with the aid of toll service.

Our toll business has fallen off due to changed business conditions affecting most seriously those classes of business that formerly were our mainstay, but—

New business firms are being formed every day; some firms are doing more business today than ever in their history, and numerous firms are changing their methods of doing business; to them we shall look for this additional business to replace that we have lost. New firms, new business volumes and new methods need our toll service; it is our duty to help meet and serve these new conditions.

In a period of falling prices distributors are loath to extend large credits, and retailers buy as little as possible that they may not be caught with a large stock of high-priced goods. No period in our history could be so favor-

able for the development of toll business as the present.

Some Typical Cases.

Instead of trying to sell goods at prices fixed by letter, catalogue or by salesmen conferences, the telephone is at hand to care for sudden changes in the market. A large distributor of goods who was using our toll service to the extent of $200 a month was more fully acquainted with the facility of our service. Recently when there was a marked change in the prices of goods, he used our service to the extent of $600 to quickly afford his customers the advantage of the drop in prices. He and his customers were delighted with the results and from now on he will make a larger use of our service, stating that he can make sales effectively from his office by telephone.

Personal relations between the head of the concern and the customers the firm sells are of greatest importance to the firm. How to develop and to maintain these relations is a serious problem. One concern using our service to the extent of nearly $200 a month was shown how the personal relations which had been developed might be strengthened through the use of toll service. That firm is now using each week a large number of toll calls for this particular purpose in addition to the previous uses, and service is now used by them to the extent of $300 a month.

There would appear to be no relationship between toll service and economy counters or small town five and ten cent stores. Yet upon investigation it was found that suppliers of these goods had a problem in how quickly to give their customers the advantage of favorable offerings. When we explained how our toll service would solve their problem they were so greatly pleased that they used our service to the extent of $75 in one month, with which they made such quick and satisfactory sales that they intend largely to increase this service use. Nineteen test calls placed by them resulted in eighteen talks and eighteen sales.

Garden truck and perishable articles entail great losses unless immediately sold. They cannot be carried in stock or well be disposed of through orders solicited by traveling salesmen. A produce dealer was shown how our service would enable him greatly to expand his market to include points some hours distant by express. As a result of the commercial man's work this dealer placed more than one hundred calls, two-thirds of which resulted in sales. More remarkable was it that most of the people he sold to he had never sold before. That produce merchant formerly used our service to the extent of $35 to $50 a month; he has now extended his monthly use of the service to $250 and more.

Study the Patron's Problems

These are a few typical cases to show how great is the need of general business today for long distance service, but each line of business must be shown firm by firm its adaptability to their particular business. This can be accomplished by our commercial men studying each line of business and then taking up firm by firm until all the firms in that particular line of business have been thoroughly acquainted with our facilities and their problems studied and solved.

In no case should an endeavor be made to sell long distance service merely because that is what we have to sell. The whole program is based upon a study of the commercial problems of the firm visited to ascertain whether their business could not be conducted at a lesser cost or the volume of business increased, or their business expedited and made more satisfactory to their trade by the use of our toll service. In this way warm admirers are made for the telephone company and many business firms have expressed sincere appreciation of the service we have rendered them. Public relations of the best sort are thus developed.

It takes commercial work at each end of the line really to sell toll service just as it takes two or more operators to handle each toll call. In this respect toll service sales differ from exchange service sales.

It is not sufficient to work up interest in toll service at one end of the line and leave the other to chance. At the other end may be a man not fully educated on all of the fine points of doing business by telephone. Team work on the part of commercial men and information passed, from the town in which the service is being sold, to the more important towns to which the service would be most needed by the firms solicited, will produce results. It follows that the commercial forces are interested and concerned in the sales programs being conducted in any nearby important center.

To replace the toll business we have lost and to gain the additional business which can be developed is a large task, one requiring a comprehensive program involving traffic, plant, engineering and commercial forces in each district and in every exchange area.

That each may know his part of the whole, each branch of the department of operations is preparing and will issue information and advices on toll service and sales and objectives of service and sales to be attained throughout each portion of the territory.

Measured by districts and particularly by exchanges the task is within the ability of all to accomplish. One more toll call per station every three months means one million dollars additional toll revenue yearly for the Group.

Each line of business studied presents new toll sales aspects and as we go further and further into the matter, it is astonishing to see what possibilities are uncovered for long distance business.

Hiring by the Minute

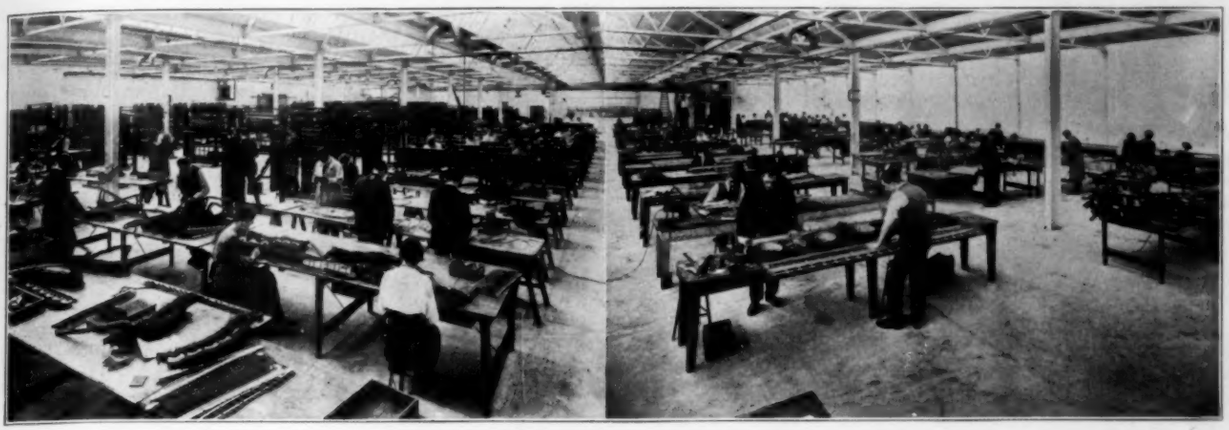
We have an extensive plant and a large force which may be employed at a minute's notice, by the minute, and the use of which brings to a firm no difficulties or embarrassment in the way of employing and laying off people. There is no business we have looked into so far but can be helped by the use of long distance service.

The coming intensive campaign for the sale of toll service is not purely altruistic. We have the selfish motive that if we can help the other fellow's business to pick up, ours, too, will pick up. We will help ourselves by helping others. We are in business not alone to serve but to profit by serving.

Now, while the main purpose of this is to acquaint each member of the large telephone family with what we are doing or intend to do in the way of increasing toll service use, you, the reader, are asked the question "What are you doing to increase the toll business"? You in the field naturally are in close touch with the customer; not those in the general offices. You are somewhat acquainted with the character and magnitude of the business of the firms in your community. Having the opportunity to discuss daily with these firms what we are doing and what we hope to accomplish for them and, therefore for ourselves, you have the duty that accompanies your opportunity.

Your belief and enthusiasm and your pride in the service will convince the doubtful. The resulting benefits will make you an appreciated man in your community.

NEWS FROM FOREIGN LINES



Not So Many Months Ago the Scene in This Plant Was a Blight on the Vision of "Kultur". Now in Peace Time It's Busy Promoting International Understanding.

British Automatic Thriving

Liverpool Plant Making Strowger Automatic Equipment Grows Since 1911 Into a Ten Acre Factory and Sells to Far Corners of the Telephone World

By H. E. Clapham

Liverpool, England.—The plant of the Automatic Telephone Manufacturing company, Ltd., in this city, is now fully equipped for the engineering and manufacture of Strowger Automatic telephone equipment in large quantities for use in Great Britain and foreign countries.

Accomplishments of this contemporary enterprise of Automatic Electric company of Chicago, during the past few years have been remarkable. During the war its normal resources and activities were almost entirely dislocated, but in spite of the serious hindrances that war-time projects entailed, it was able to manufacture and place in service many thousands of lines of equipment.

Since that time the company has been successful in adopting and carrying out plans for the entire rearrangement and re-conditioning of manufacturing equipment, and in building up an engineering and manufacturing organization that is adequate for the extensive needs of automatic telephony.

Ten Acre Plant.

The buildings of the Company are located at Edge Road, Liverpool, and occupy a site of nearly ten acres adjacent to one of the principal railway arteries of the country, they include, besides manufacturing shops, an up-to-date laboratory and research department and a commodious suite of offices for the accommodation of the engineering and commercial staffs.

Organized in 1911, the major activities of the company were immediately directed towards the engineering and manufacture of automatic equipment, and during the short interval from this time until the beginning of the war brisk progress was made. A number of exchanges were installed and contracts with the British Government were entered into for the equipping of other plants.

When the war intervened, almost the entire capacity of the plant had to be devoted to the production of munitions, which imposed so severe a strain on the existing machinery, that at the date of the armistice, plans had to be adopted for the entire re-arrangement and conditioning of the plant equipment, the restoration of buildings, and the renewal of floors, to facilitate a return to normal production.

Makes Virtue of Necessity.

Advantage was taken of this emergency to modernize the plant, and to establish engineering and production methods in keeping with the very latest practices. To assist them in this work, Automatic Electric company's twenty-five years of experience in mass production and engineering, as well as the personal services of a number of that company's foremost engineers and manufacturing experts, were placed at the disposal of the Liverpool company.

How thorough their work was, and how satisfactory the results, may be judged from the photographs reproduced herewith. It will be admitted that the details shown in the way of machinery and other plant equipment support the claim to

modernity. While the extent of the production capacity indicated is great it is necessarily capable of considerable expansion to meet the expected and growing demand for Strowger Automatic.

Dalhy, Manchuria,
Basra, Mesopotamia,
Poona, India,
Lahore, India,
Shanghai, China,
Teishinshho, Japan.

Where the Nimble Fingers of Women Fly at Their Labors, and Expert Supervisors Check the Accuracy of Each Operation. A View in the Great Liverpool Plant.

Prior to March, 1920, the company operated as a separate entity, but being impressed with the advisability of concentrating upon mass production as the best means of meeting international competition, an alliance with a sales organization, the International Automatic Telephone Company of London, was made.

Both at London and Liverpool, first-class engineering staffs have been organized. Experienced telephone engineers from all parts of the country have been brought into the service of the company. In addition to this, through the continual preservation of the close relationship between Automatic Electric company and its British associates, the latter are able to avail themselves of all the information and experience gathered by the former company during their many years of activity.

The new company operates outside the United Kingdom only, and having succeeded in securing a valuable range of foreign contracts, may be regarded as an economic venture which has thoroughly justified itself. Among the installations which are already well under way are the following:

Buenos Aires, Argentine,
Iriondo, Argentine,
Cordoba (extension), Argentine,

Subscribers See Red In Soviet Rates.

Moscow, Russia—Yearly rate for telephone service now is 350,000 roubles for a single subscriber. A phone installed in a large house and used by a number of persons costs 500,000 roubles. Long distance rates for three minutes conversation have been raised considerably. A typical raise is from 1,800 to 7,200 roubles.

In addition to these, several valuable inquiries are under consideration, and promise to develop into orders at an early date.

With the talent now under the control of the British company, and the engineering information and resources placed at their disposal, its clients are assured of the latest information on the Strowger Automatic system and the expert handling of any problems that may confront them.

Wire-Wireless Idea Is Being Given Thought in Sweden.

Stockholm, Sweden — Government telephone men are working on a combination of telephone equipment that will link wire and wireless apparatus. Experiments thus far conducted have been very promising.

New Austrian Rates Run Into Fancy Figures (Kronen).

Vienna, Austria—On the new rates a subscriber making 40 calls a day pays 36,000 kronen; 24 calls, 14,400 kronen; 12 calls, 6,840 kronen. See what the rate of exchange is today and figure it out in American dollars.

Czecho-Slovakia Adds to Its Phone Lines.

London, Eng.—In less than two years, according to the Times, 6,250 miles of line have been added to the Czecho-Slovakian telephone system.

Berlin and Copenhagen Talking Via Wireless.

Berlin, Germany.—Highly successful experiments in wireless telephony have been conducted between this city and Cophenhagen.

A Score of Shop Sights Like This One Prove that Foreign Trade Business in Automatic Telephone Equipment is All O. K. with the Automatic's Liverpool Plant.

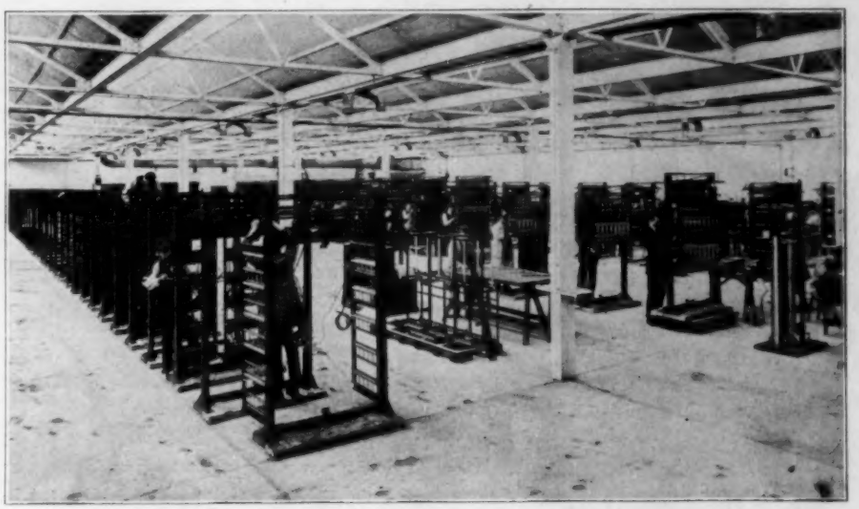
WANTS PHONE BOND.

China Realizes Long Distance Service Vital to United Country.

New York City.—Clark H. Minor, former manager of the China Electric company of Peking stopping in this city en route to his new work at London with the Western Electric interests, declares: "With full realization that little progress will be made in the unification of their country until it adopts modern methods of internal communication, the business men of northern China have started agitation to link up all their principal cities by telephone toll lines."

"Work has already begun on a long distance line between Shanghai and Peking that will connect with the toll system now in operation between the northern capital and Tietsin," he said. The latter line, which has the distinction of being the only inter-city cable now existent in China, is only 100 miles long. The new artery of communication probably will be completed late this year. It will cost about $500,000 and will be constructed according to American standards.

"The Chinese are great admirers of the telephone. They have become tired of the difficulties which beset their use of the telegraph where the many characters of their alphabet force them to send all their messages in code, and want to enjoy the time-saving methods of approach, familiar to Americans. Consequently, new exchanges are being erected in most of the larger cities to augment the 55,000 subscriber lines already in use in the Celestial Republic.



A Vista of Magnificent Distances Where Automatic Equipment Begins to Assume Its Familiar Identity. Assemblers Are a Small Army at the Liverpool Automatic Factory.

"Girls are being trained for the "hello" job in Shanghai for the first time. It is very probable also that the more talkative sex will be used in the opertion of the new system in the Yangtse Valley. Hitherto due to the cheapness of male labor all work at the Chinese exchanges has been done by men."

Mr. Minor believes that it will take about ten years to give China the kind of telephone service its more active citizens desire. Some of the less progressive reactionaries of the republic are inclined to make a more pessimistic estimate but their fears are offset by the enthusiastic optimism of the young men recently graduated from the technical colleges in the United States and Europe.

Nearing the First Lap of the Journey from the English Automatic Plant. Over the Seven Seas These Telephones Will Be Shipped in a Multi-Million Business that Was a Harris Dream.

Big Deficit Looms for the English Telephones.

London, England.—Estimate of Post Office revenue for the year 1921–22 was £60,000,000, while five months' actual business yielded only £18,500,000, suggesting at this rate a deficit on the year of £15,600,000. The increase during the five months over the corresponding period of last year is only £250,000. The figures represent revenue paid into the Exchequer, but not total revenue. One important point is that there has been a change in telephone accounting, whereby accounts are rendered quarterly instead of monthly. The figures, therefore, do not include full telephone receipts, which will be given in late returns.

French Telephone System In Bad Shape.

Paris, France.—Reports from dependable sources indicate that the financial condition of the government's telephone system is such that private capital is to be invited to purchase the enterprise and bring it up to modern efficiency and profits.

Cumberland Giving Humboldt, Tenn., Modern Plant.

Humboldt, Tenn.—This community is to have as good a telephone plant as any in the state, according to officials of the Cumberland Telephone and Telegraph company, who are here supervising the $70,000 common battery system installation.

DOMMERQUE JOINS.

Federal T. & T. Company Gets Prominent Engineer On Its Staff.

Buffalo, N. Y.—On October 1st, Franz J. Dommerque became associated with the Federal Telephone & Telegraph company for the principal purpose of devoting his energies to the development of the company's foreign business.

Mr. Dommerque is well known to the telephone trade in this country and abroad as he is one of the pioneers in the field. He received his education abroad, classical as well as technical.

After having finished his studies at the technical university of Zurich, Switzerland, and Munich, Bavaria, he received a general practical training by five years work in steam engineering, electric lighting, electric railroading and electric welding in England and America.

In the Fall of 1893, he specialized in telephone engineering by entering the engineering department of the Chicago Telephone Company where, during the next six years, he added his share to the development of telephone engineering, principally in original investigations on the economic design of large telephone plants. During this period he participated in the reconstruction of the entire plant of the Chicago Telephone Company to common battery.

He contributed largely to technical literature by numerous articles on telephone and mathematical subjects. As a result of his contributions to mathematical literature, he was elected to membership in the International Association for the Promotion of the Study of Quaternions and Allied Subjects of Mathematics.

In 1899 Mr. Dommerque joined the staff of the Kellogg Switchboard and Supply Company of Chicago. The first years in this new position were taken up with outside engineering principally in the planning and supervision of the switchboard installations in large cities such as Buffalo, Cleveland, Columbus, Indianapolis, St. Louis, Los Angeles and numerous others. In this capacity he became familiar with all important telephone plants from the Atlantic to the Pacific.

In 1902 Mr. Dommerque was made secretary and director of the Kellogg Switchboard and Supply company but still continued his commercial engineering work in the capacity of general sales manager, supervising at the same time, all foreign patent cases of the Kellogg company.

From 1902 on he devoted considerable of his time to the development of foreign business and made numerous business trips to Europe and South America.

In 1909 he severed his connection with the Kellogg company and for one year acted as consulting and contracting engineer for the Stromberg Carlson Manufacturing company of Rochester, N. Y. In 1910 the Western Electric company of New York and Chicago engaged him on the basis of his success in, and knowledge of, the foreign business, to go to Europe as a special representative in connection with the introduction of its automatic system.

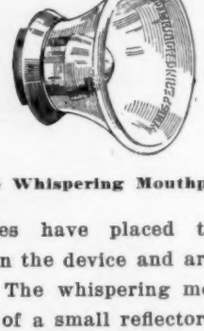
During the next four years he participated in the negotiations with the various European governments and also with a number of municipalities and made numerous development studies in England, Germany, Hungary, Belgium, Holland, Switzerland, Denmark. While in London he made development studies for the new automatic installations in Sidney, Australia, and Wellington, New Zealand, with the engineers of the Australian and New Zealand governments.

Shortly before the war broke out in Europe, he returned to America and passed his time in writing for technical journals abroad and also with the composition of technical books, waiting for the termination of the war so that he could enter again the foreign field.

In 1913 Mr. Dommerque was made a Fellow of the American Institute of Electrical Engineers.

"Whispering Mouthpiece" Use Grows, Say Makers.

Chicago, Ill.—Colytt Laboratories, makers of the whispering mouthpiece report that a number of telephone companies have placed their approval on the device and are installing it. The whispering mouthpiece consists of a small reflector inserted in the mouthpiece, and held there by means of a clip which screws into the transmitter like the ordinary mouthpiece. The parabolic reflector is said to concentrate sound waves on the transmitter and allow the use of lower tones in conversations. Sanitary features of the whispering mouthpiece also are emphasized.



The Whispering Mouthpiece.

New York Boys Knock Wiring Record into a Coma.

New York City.—Construction forces of the New York Telephone company in one week recently installed 17,980 miles of telephone wire in greater New York. This puts the previous high mark for a week about 3,000 miles to the bad. On the basis of a 44 hour working week the installation is equivalent to stringing seven miles a minute.

Southwestern Bell "Quick on Trigger" with Flood Ads.

Houston, Tex.—San Antonio's disastrous flood and the anxiety of Houston residents to communicate with relatives and friends in the devastated districts made the condition of long distance telephone service one of vital importance to the Southwestern Bell Telephone company's subscribers in Houston. The telephone company was quick to answer the community with big space newspaper advertisements headed "Long Distance Calls to San Antonio Can Be Handled As Usual". The advertisement said: "There may be some delay on calls, due to the fact that about 5000 telephones in the flooded area are still out of service and are being replaced and rewired, but all calls will be handled as rapidly as possible. Our Long Distance Lines were never entirely out of service. Within 12 hours after the flood they were completely restored and working at full capacity."

Cumberland Backs Increase Plea by $50,000 Offer.

Knoxville, Tenn.—An offer of $50,000 toward defraying expenses of an appraisal has been made by the Cumberland Telephone and Telegraph company, provided the united cities of Tennessee which are fighting a rate increase, would allow the proposed new rates be placed in effect at once. In event that the decision of the utilities commission is adverse to the telephone company, the utility will refund the amount paid by subscribers as the rate increases.

C. W. DAVIS DIES.

Cable Genius Dies Following Long Illness—Official of Standard Underground.

Pittsburgh, Pa.—Charles W. Davis, vice president and general sales manager of the Standard Underground Cable company, of this city, died September 11 in the Memorial Hospital, New York. He has been in failing health for several years and had gone to New York for special medical treatment. Interment was at Pittsburgh on September 13.

Mr. Davis was born in Pittsburgh 48 years ago and was educated at the Western University of Pennsylvania, now the University of Pittsburgh, and at Massachusetts Institute of Technology. His connection with the Standard Underground Cable company began shortly after his graduation from college, about 1899, at which time he was employed by the company as construction engineer on a large cable installation in Mexico City. Later he became superintendent of construction and manager of the central sales department, continuing in these positions until 1915 when he was elected vice president in charge of the general sales, construction and accessories departments.

He was well-known in the electrical industry as an expert on the design, manufacture and installation of electric cables and accessories, and had contributed largely to the development of the art by his investigations and occasional technical papers, and by his many inventions dealing with improvements in methods of cable construction, installation and operation. He was a member of the American Institute of Electrical Engineers, the Pittsburgh Club and of the Edgeworth Club and Allegheny Country Club of Sewickly, Pa.

G. L. Shepley Chosen Director to Fill S. P. Colt Vacancy.

Boston, Mass.—G. L. Shepley, prominent Rhode Island financier, and a resident of Providence, has been chosen to fill the vacancy in the directorate of the New England Telephone and Telegraph company caused by the death of Samuel P. Colt.

Springfield, Mo., Shares in Southwestern Building.

Springfield, Mo.—Extensions of the Southwestern Bell Telephone company's lines in this city are being made as part of the organization's plans to make a big drive for catching up on the demand for service.

STILL MOUNTING.

Illinois Bell Answers Rate Decrease Demand With Increased Cost Data.

Chicago, Ill.—Operating expenses of the Illinois Bell Telephone company have increased since the public utilities commission authorized an increase in rates last December, was the answer filed by the telephone company to the citation of the Illinois Commerce Commission to show cause why the rates should not be reduced.

In another part of the answer the company questioned the method of procedure adopted by the commission in issuing this citation and asked that the citation be dismissed, but stated that it will co-operate with the commission in any proper proceeding brought under the Illinois law.

The answer said that the present rates, effective January 1, 1921, were authorized and approved as just and reasonable by the public utilities commission December 20, 1920, after an eighteen months' investigation conducted by the commission and that its order has never been reversed and still stands.

That the company has filed with the commission monthly reports of revenue and expenses since January 1, 1921, when the present rates became effective, was brought out in the answer.

Standards for Testing Welds Are Formulated.

The American Welding Society, 33 W. 39th St., N. Y., has issued Bulletin No. 1, on "Standards for Testing Welds." The chief difference between testing a specimen of steel that includes a welded joint and testing an ordinary specimen is the non-homogeniety of the welded specimen. The welded specimen has at its center, a section composed of material that usually has physical, chemical and metallurgical characteristics distinctly different from the adjoining metal. Furthermore, the section of the added metal is more or less irregular in shape and variable in size. Consequently the procedure prescribed for testing ordinary specimens is not applicable to specimens containing welded joints. Differences in details of procedure have caused widely divergent results and comparisons are frequently impossible, with the result that the usefulness of much of the research work on record is generally restricted and in many cases the results are actually misleading. Although more thorough research work in this field may develop more satisfactory standards for tests of welds, the need for some immediate standards is so great that the universal use of the specifications is urged upon all those who have to do with testing work in this field. Criticisms and suggestions are invited. The present standards will be valid for a period of one year and at the end of this period they will be modified if it is found desirable. A copy of Bulletin No. 1 can be had on application to the address above given.

DUCT WIRE PULLING REEL

The reel with a mechanical advantage of six to one permits of easy removal of the wire, eliminates the dangerous conditions existing when wire is pulled along a street, and eliminates wastage of wire. The reel was delivered after careful consideration of a power-driven reel. —Telephone Review.

CANADA'S OWN LINE.

First Convention of Canadian Association Booms Cross-Country Wire.

Vancouver, Can.—Considerable comment favoring an all-Canadian transcontinental telephone line was one of the big features of the first annual convention of Canadian telephone companies.

Engineered by N. G. Fitchpatrick, general superintendent of traffic of the British Columbia Telephone company, the sessions ran off swiftly and profitably for the representative attendance.

The next meeting of the association is to be held in Montreal. W. H. Winter, general plant superintendent of the Bell Telephone company of Canada was elected chairman, and W. H. Black, convention secretary.

B. Jones, commercial superintendent of the Saskatchewan Government Telephones, addressed the first session on "Public Relations." He said good manners were one of the first essentials in efficient service and good relations between the subscriber and the company. He went carefully over the points in this regard, adding that company publicity was needed, and the object of that publicity should be enlightenment. He contended that the telephone was a necessary service to the public at large, and that the public should generously support it so that companies might go ahead with plans for future development with confidence that the public was behind them.

The first of plant technical papers was delivered at the afternoon session, when W. H. Winter, general plant superintendent of the Bell Telephone company of Canada, spoke on "Standard Construction Methods."

He was followed by N. M. Lash, chief engineer of the same company, on "Telephone Transmission." This talk was illustrated by means of charts.

E. P. La Belle, general superintendent of plant of the B. C. Telephone company, talked on the "Gulf of Georgia Submarine Cable." J. D. Baker, plant superintendent of the Alberta Government Telephones, gave a paper on "Toll and Rural Lines," and R. Young, local manager at Winnipeg of the Manitoba Government Telephones, spoke on "Automatic Telephony," explaining the system which was installed in that city some months ago.

H. O. Hutt, traffic supervisor B. C. Telephone company, read a paper on "Preparations for Cutting Over from Manual to Automatic from a Traffic Standpoint."

The development of wireless telephony was explained by J. H. Vennes, transmission expert for the Northern Electric company at Montreal. His address contained much interesting information, and was followed by a practical demonstration. Equipment was set up in an adjoining room at the Hotel Vancouver, and each of those present listened to speech being transmitted without wires from the Seymour office, a distance of about three blocks.

The following motions were presented to the convention and adopted:

That this association furnish its constituent members a list of all department heads of such companies, and further, that each member company shall furnish the respective departmental heads of each of the other member companies a copy of all circulars, routines and other official information or data issued by such company department.

That a committee be appointed to investigate and recommend for adoption standardized regulations covering the problems as they affect Canadian telephone institutions, on electrolysis, high-tension interference and joint pole construction; and, further, that such regulations be submitted to the proper authorities for the purpose of securing legislation necessary to have such recommendations put into effect at the earliest possible date.

That a committee composed of a representative from each system be appointed to compile and furnish data on depreciation, one of this committee to present a paper on this subject at the next annual convention. The committee is as follows: Messrs. Lash, chairman; Pearce, New Brunswick; Lemmon, British Columbia; Baker, Alberta; Warren, Saskatchewan; W. A. Winfield, Nova Scotia; Brockwell, Manitoba.

Photo Gwilliams

Stockholm claims to be the banner telephone city of the world. 100,000 subscribers in a city of 400,000 population is the Stockholm figure.

When you go into a restaurant there, the waiter brings you a telephone with the bill of fare. When a steamer docks, a telephone connection is established instantly.

Walk along any street and you will have public telephone stations handy.

Here is a view in Stockholm that gives you an idea of the intense cultivation of the telephone business in the Swedish metropolis.

Texas Company Formed With $100,000 Capital Stock.

Dallas, Tex.—Ralph Sparks and S. M. Prewitt of Reeves county and I. Sparks of Socorro, N. M., have incorporated the Pecos and Northwestern Telephone company with a capital of $100,000.

Mt. Vernon, Ill., New Officers Headed by Wimberly.

Mount Vernon, Ill.—Annual election of the local Independent Telephone company resulted in naming the following as officers for the ensuing year: W. L. Wimberly, pres., J. M. Latta, sec., G. L. Robinson, treas.

Minnesota Town Cuts In Automatic System.

Redwood Falls, Minn.—Automatic telephone service now is being given the patrons of the Redwood Falls Electric Telephone company. The cut over was a complete success in local public opinion.